A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

February 21, 1952

NTS PAGE 2

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THE NEW BRITAIN MACHINE COMPANY

Greater Productivity

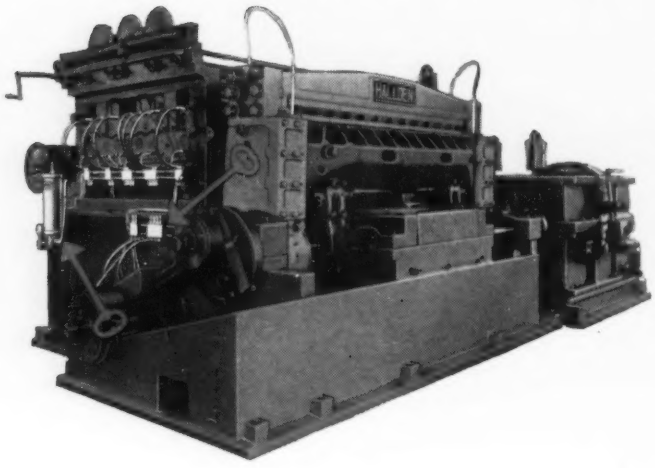
AUTOMATIC BAR AND CHUCKING MACHINES · PRECISION BORING MACHINES
LUCAS HORIZONTAL BORING DRILLING AND MILLING MACHINES

NEW BRITAIN
Automatics

THE NEW BRITAIN-GRIDLEY MACHINE DIVISION
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT

Farval solves the lubrication problem on Automatic Shears

FARVAL—*Studies in Centralized Lubrication* No. 128



KEYS TO ADEQUATE LUBRICATION—*Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine will be properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.*

Photo by courtesy The Hallden Machine Company.

AUTOMATIC flattening and cutting machines in steel mill service get rough treatment. There are always scale and dirt in the air. To keep dirt out of bearings, enough oil is used to insure its working out of the bearing ends. In most mills, machines are worked round the clock, so there is no time to lubricate without shutting down. Continued use without proper oiling guarantees trouble.

To insure adequate, continuous lubrication, The Hallden Machine Company depends on Farval Centralized Lubrication. In fact, it has been standard practice with Hallden to install Farval on every machine it has built in the past 25 years. They believe this is the surest way to keep their machines functioning smoothly.

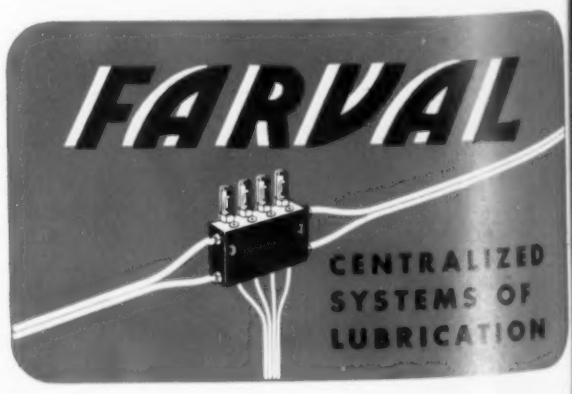
Farval accomplishes correct bearing lubrication while machines are in operation, without disturbing production schedules. Result: No slow downs, no breakdowns, no down time for repairs due to faulty oiling.

Farval is the original Dualine system of centralized lubrication for industrial equipment, proved practical in 25 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, the Farval system unfailingly delivers oil or grease to each bearing—as much as you want, exactly measured—as often as desired. Indicators at all bearings show that each valve has functioned.

In or near your city there's a Farval engineer, ready to discuss your lubrication problems and suggest a proper system to meet your particular needs.

The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



66,000 lb Table Girder Made By Welding

This huge chunk of steel is a table girder, for use in a rolling-mill runout table. It is 43 ft long, 4 ft, 2 in. deep, and 13 ft, 6 in. wide, and weighs 66,000 lb. It was produced largely by welding.

The machinery you build or the parts you need may not compare with this table girder in size. But whatever you require, and no matter how intricate it may be, it will be well worth while for you to look into the advantages of Bethlehem Weldments.

We'll be pleased to discuss weldments with you in detail. Drop a line to the nearest Bethlehem office, stating when you would like our representative to call.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

FOUR BIG ADVANTAGES OF BETHLEHEM WELDMENTS

1. With Bethlehem Weldments, excess weight and unduly large sections are eliminated without any sacrifice of rigidity. What's the result? A definite dollars-and-cents saving, because the cost of the finished machine is correspondingly reduced.

2. Bethlehem Weldments are extremely versatile. They can be made in a wide range of sizes, for use as simple parts or in assemblies.

3. With Bethlehem Weldments you get complete freedom of design. This is because the steel can be bent, pressed, or otherwise shaped prior to welding, without harm to its physical structure.

4. Bethlehem Weldments can be used alone, or with forgings or castings.

BETHLEHEM STEEL

BETHLEHEM WELDMENTS

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IRON AGE

FEBRUARY 21, 1952
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CONTENTS

*** Starred items are digested on opposite page.**

EDITORIAL Forward—Backward, March! 7

NEWS OF INDUSTRY

★Special Report: Alcoholism Costs You Too Much 51
★Production: Controls Check Tinplate Sales 52
★Manufacturing: Can you Use Boron Steel? 53
★Labor: Tempers Flare at Steel Wage Hearings 55
★Financial: Need Cash? Washington May Help 56
Raw Materials: Erie Mining Plans Taconite Expansion 57
Controls: You Won't Get Much More Metal 58
Defense Contracts 64
Construction Steel News 66
Industrial Briefs 74
Personnel: Iron Age Salutes 85
Iron Age Introduces 87
Clearing House 154

NEWS ANALYSIS

Newsfront 49
★This Week in Washington 71
★Automotive Assembly Line 76
Machine Tool High Spots 81
West Coast Report 83

TECHNICAL ARTICLES

★Investment Casting Quality Tied to Gating, Mold Turbulence 92
British Study Corrosion of Steel, Iron Pipe 97
★Lower Alloys Developed For High Temperature Use 98
Jet Part Machining Time Cut From 30 Hr to 5 Min 103
★Power Transmission Through Belts 104
Low-Carbon Ferro-Chrome-Silicon Cuts Stainless Ingot Costs 108

MARKETS & PRICES

★The Iron Age Summary—Steel Outlook 135
Market Briefs 137
Nonferrous Markets 138
Iron and Steel Scrap Markets 140
Iron and Steel Scrap Prices 142
Comparison of Prices 144
Warehouse Prices 145
Steel Prices 146

REGULAR DEPARTMENTS

Dear Editor 9
Fatigue Cracks 11
Conventions and Meetings 13
Free Publications 117
New Equipment 122

INDEX OF ADVERTISERS 168

DIGEST

of the week in metalworking

PAGE 51 **ALCOHOLISM COSTS INDUSTRY TOO DEARLY** Alcoholism is costing industry about $1 billion a year. A plant of 1500 employees will average about 60 problem drinkers. Decreased productivity, higher accident rates, absenteeism and lateness leave business with a hangover. With a new program, Con Ed of New York showed good results.

PAGE 52 **CONTROLS BLEED TINPLATERS' BUSINESS** Business of tinplate producers is off "substantially" from 1951 although demand continues high. Government restrictions on end uses and exports have put a damper on the market. Producers argue controls are no longer necessary. New capacity is scheduled to come in—in a soft market.

PAGE 53 **WHAT ARE DRAWBACKS TO BORON STEELS?** Despite rearmament period shortages of alloy steels, the substitute boron steels are often eyed askance by industry. It's true boron steel acceptance will grow—but very slowly, unless a stiffer war shortage evolves. To most firms boron steels are unproven. Case histories of use experience are given.

PAGE 55 **MURRAY BOILS OVER AT STEEL WAGE TALKS** Monotony of New York's steel wage hearings was interrupted by sharp outbursts of temper—particularly by the union's Philip Murray. When U. S. Steel Co.'s Brad Smith claimed that the steel industry was getting easier and easier for the worker, Mr. Murray launched his verbal torpedoes.

PAGE 56 **WASHINGTON WILL HELP YOU ON LOANS** Expansion of small business is traditionally hobbled by lack of surplus capital. With today's inflated costs and the need for new facilities for rearmament this lack of cash is particularly distressing. Three kinds of U. S. aid are being provided: Tax relief, pricing relief, and government financing.

PAGE 71 **ROCKY ROAD FOR EXTENSION OF CONTROLS?** Administration propaganda supporting a 2-year extension of controls over prices, profit, materials, and wages got off to a fast start. But Congress feels that many consessions must be made in the coming weeks. The Senate hearing opens Mar. 4. The House will start after it finishes.

PAGE 76 **AUTO UNION OUSTS ITS GM DEPT. CHIEF** United Automobile Workers ousted their director of the GM Dept., A. T. Johnstone. Reasons given were Johnstone's "health and certain policy differences." Johnstone said the reasons were poorly founded. Union sources insisted disagreement with Walter Reuther had necessitated the ouster.

PAGE 93 **INVESTMENT CASTING GATING, TURBULENCE** Flask temperature does not affect hardenability or tensile strength of 4140 and other alloy steels studied at Arwood Precision Casting Co. Investment casting quality is tied to gating designed for minimum turbulence. Proper gating produces cleanest castings, least scrap; minimizes inclusions.

PAGE 98 **LOWER ALLOYS FOR HIGH TEMPERATURE USE** Low-alloy steels for high temperature bolts have been modified for 1100°F use. New steel has minimum rupture strength of 30,000 psi for 1000 hr at high stress. Prior high normalizing temperature does not increase high-temperature strength of the lower alloys, but does help 12Cr stainless.

PAGE 104 **USE OF BELTS FOR POWER TRANSMISSION** Group drives using flat leather belts still find much use, as do flat belt drives on individual machines. But V belt drives now are much more common. Among special V belt drives available are speed changing and automatic tension control devices and belts designed for over-and-under drives.

PAGE 135 **STEEL DECONTROL AWAITS WAGE SETTLEMENT** Peaceful settlement of the steel wage-price impasse will mean more pressure for decontrol. Washington isn't in a mood to lift restrictions much until the steel case is settled. Extending the strike deadline doesn't mean there is any less danger of a shutdown. Producers will keep pressing.

NEXT WEEK **RECOVERY OF MANGANESE FROM O-H SLAG** From slag containing 2.5 to 11.5 pct manganese, about 6 out of each 10 lb of this critical steel ingredient was recovered in an experimental furnace. Resulting metal is iron-manganese mixture suitable for ferromanganese production. Iron recovered offsets much of the process cost.

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

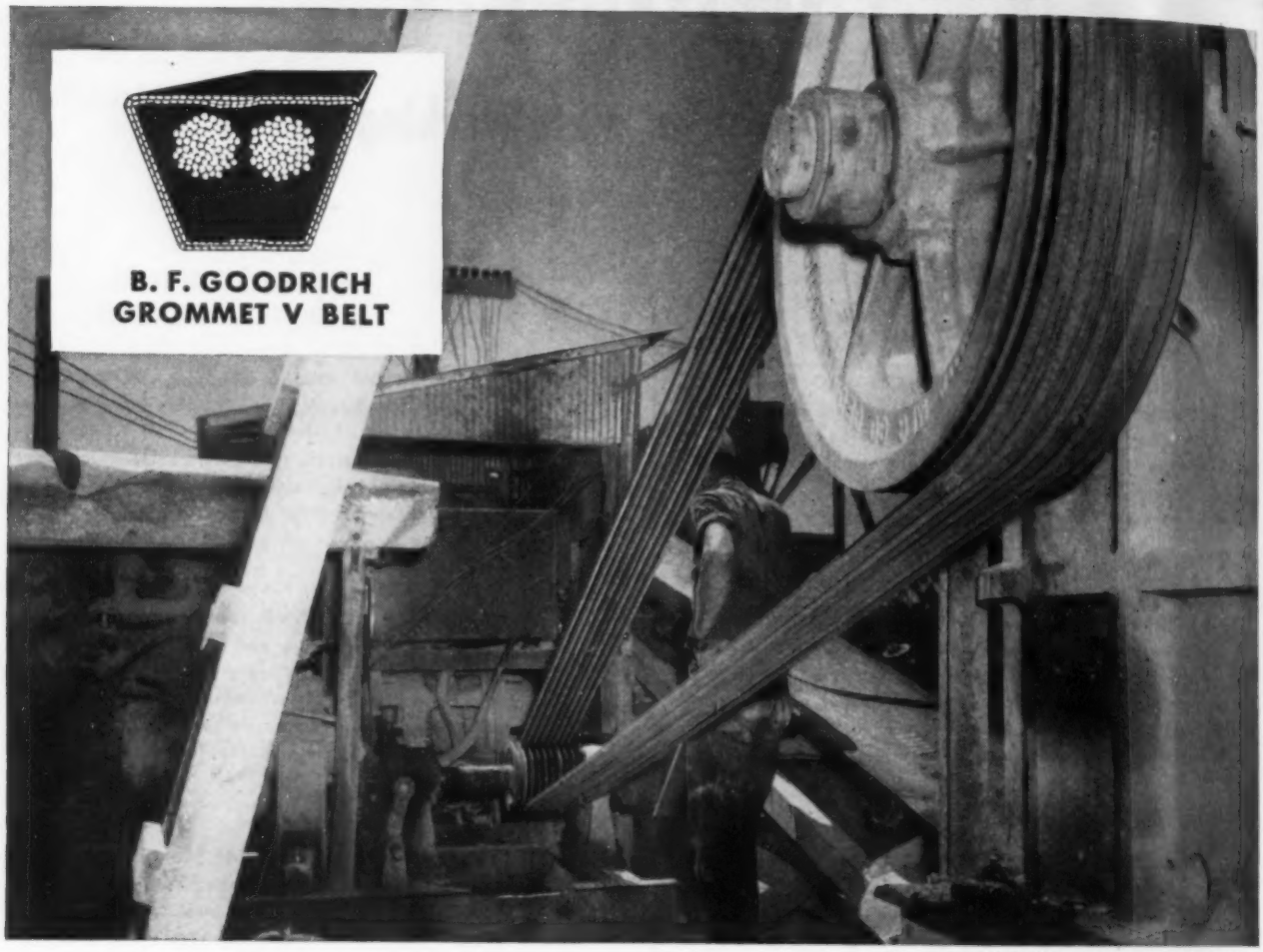

Photo courtesy of Valley Limestone & Gravel, Inc., Farmington, Iowa

Production increased 25 per cent with B. F. Goodrich grommet V belts

B. F. Goodrich often cuts belt costs 20 to 50 per cent

THESE belts drive a rock crusher 9 hours a day, six days a week. In addition to the long hours belts are exposed to dampness, oil and sharp grit. Still worse, the crusher abuses the drive with every impact of its jolting, grinding action. Previously, the operators had "tried everything" including flat belts, other V belts, even a chain drive. But mechanical trouble and production hold-ups continued.

The B. F. Goodrich grommet belts were tried at the suggestion of a BFG distributor's salesman. When the picture above was taken the grommet belts had been in operation almost 2 years. The grommet belts' record: production up 25%, large savings in labor and maintenance time, no belt replacement costs, better working conditions for men—less noise, greater safety. BFG grommet belts can be counted on to *save* because of:

No cord ends—A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength—All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one other and generate heat; cord and adhesion failures are reduced.

Better grip, less slip—Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U.S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

The Iron Age
FOUNDED 1855

Forward-Backward, March!

IN ALL the statements by the President, in all the long-winded and pretty charted mobilization reports and in all the testimony taken from the military no one knows really what we want to do or where we are going.

First, we were led to believe that we would prepare for one year of a hot war and then have standby capacity—tooled up and ready to go. Then we had civilian goods cutbacks based on fear of Russia and our lack of defense. We were going to get going—fast.

Then came the phony peace in Korea. Know-it-alls in Washington talked of stretching out the defense program. Some even said we would take a business nose dive. Thoughts of defense and what we were trying to do were overshadowed by wondering what we should do.

The public was never told anything—at least not until General MacArthur told them and lost his job for plain talk. When war in Korea surged up again we were back on the track plugging for victory. But we had no timetable; no blueprint in tons and pounds of specific materials as a guide for business people.

Cutbacks went deeper despite the warnings that unemployment and surplus of many items would result. At the same time the so-called target dates of the military—which Mr. Wilson now calls mere guesses—fell like lame ducks in a shooting match.

We are now going into the last and most pitiable stage. It is admitted that we will do in 3 years what we wanted to do in 2 years. Maybe we won't have supplies for a year of a hot war. Experts are vying with each other to explain why Russia won't attack.

The military is scared stiff to freeze military products for fear they will be obsolete. Yet it is a brutal fact that we must start some time.

The starts and stops in industry each day show that things are in a mess no matter what high-sounding words are used by government. Politics are in full play.

Maybe the whole shebang should be rewritten so that only military and military components are under control—and realistic scrutiny. If that's the case let's cut out the flag waving and try a little sincerity—for a while at least.

Tom Campbell

Editor

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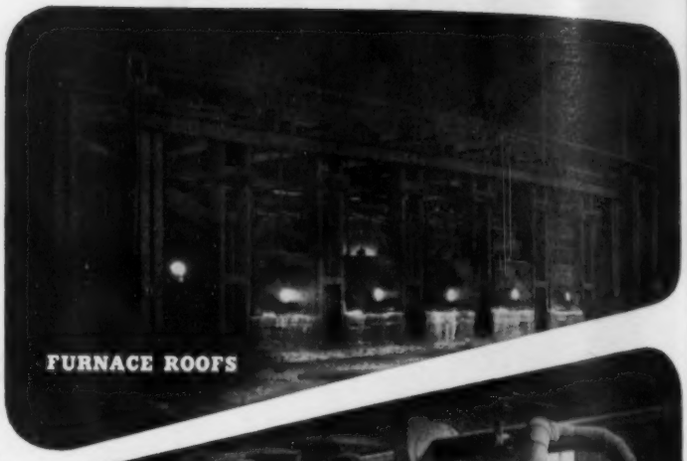
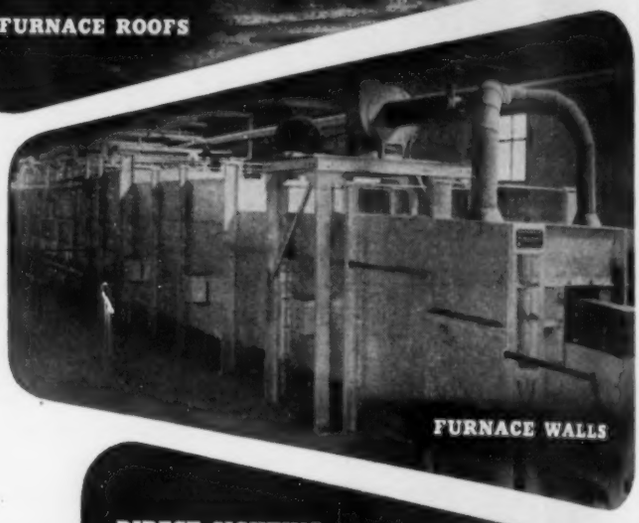
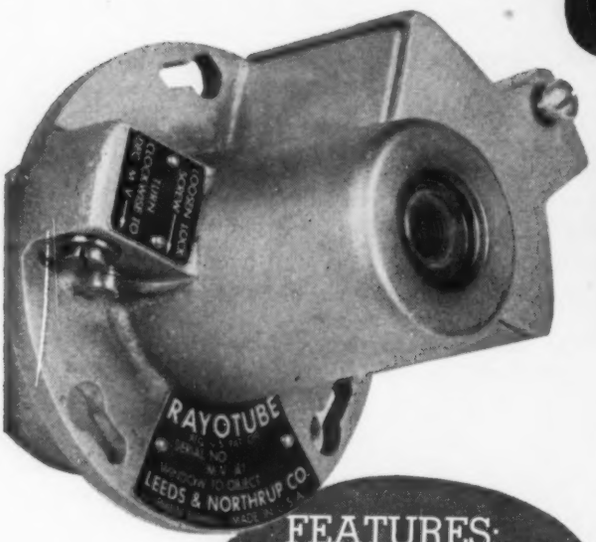
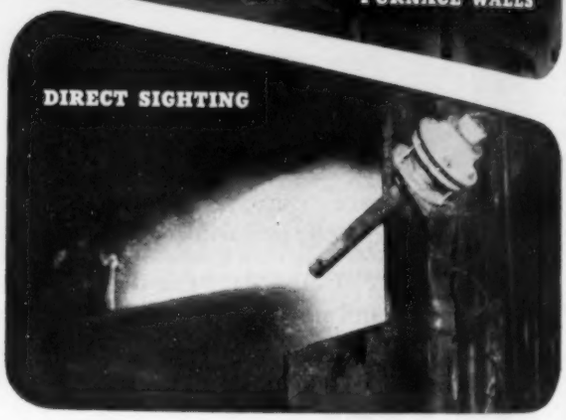
This RAYOTUBE suits all locations COOL OR HOT







FEATURES:
Quick installation
" sighting
" response to temperature



Here is the radiation-sensing unit for 9 out of every ten radiation-pyrometer uses. It adds the storekeeping advantages of smaller instrument inventory to the operating advantages* of all Rayotubes. Many hundreds of this type are now in use. Among its features:

1. Easy to install because it needs no water-jacket unless the head housing itself (shown above) reaches interior temperature of 350 F. Even then, no harm is done below 450; accuracy decreases above 350, but returns fully as temperature drops. In practical operation, even 350 is reached on very, very few installations.

When replacing a present jacketed Rayotube with this type, it is not necessary to tear out the jacket and piping. Simply insert Rayotube in jacket and turn off water if no longer needed.

2. New, quick-sighting optical system shows exact area from which temperature is being recorded. This is especially helpful when instrument is being positioned to point down an open-end tube and measure directly the surface temperature of parts being heated.

3. Can be used with Speedomax electronic instruments as well as with Micromax equipment—which blanket every temperature-recording and/or controlling job in industry.

This Rayotube is No. 8890. Any L&N office, or headquarters at 4956 Stenton Ave., Phila. 44, Pa., will send details on request.

LEEDS & NORTHRUP
MEASURING INSTRUMENTS · AUTOMATIC CONTROLS · TELEMETERS
HEAT-TREATING FURNACES

Jrl. Ad NS3(3)

*Any L&N man can give details

Dear Editor:

Letters from readers

Water Sprays

Sir:

We are very much interested in the article "Are You Getting The Most From Your Water Sprays?" by W. P. Wallace and C. E. Manes, Jr. appearing in your Jan. 31 issue.

We enclose an extra copy of this letter which you perhaps can forward to the authors with a request for additional information.

We note that the spray chamber used in this investigation contains six spray nozzles. Are these spray nozzles in a tangential pattern or a radial pattern, and we wonder how they were arranged in relation to the 1 in. diameter by 3 in. long sample piece. We assume also that the sprays were not submerged but acting in the open. We also wonder if any test work has been done on submerged sprays or submerged jets rather than open sprays.

It is our impression that maximum possible cooling effect would be obtained with the piece to be quenched completely submerged in liquid and with jets or water flow arranged to give definite water velocity along the piece. We wonder if any tests have been made to determine if an open spray method is any better than a submerged method of quenching.

E. W. WEAVER
Assistant Chief Engineer
Surface Combustion Corp.
Toledo

We have forwarded your letter to the author who will answer you directly.—Ed.

Hi-Jet Cooling

Sir:

The article "Jet Sprayed Oil Ups Tool Life 1200 Pct" appearing in your Jan. 17 issue is of considerable interest to me.

Can you give me any information with regard to the availability of the Hi-Jet system of tool lubrication and cooling? Are these units now being manufactured and if so by whom?

R. D. HARROP
Superintendent
Stetson-Ross Machine Co.
Seattle

The equipment was developed by Gulf Oil Corp. and will be manufactured by Thompson Products, Inc., Cleveland. Write to H. A. Goddard, Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa., for more information.—Ed.

Bearingizing Tool

Sir:

The article "Peening Tool Finishes Holes Fast, Accurately" in your Jan. 31 issue is of considerable interest to us. We are interested in the possible application of this process to the finishing of dies in cold heading.

We would appreciate your help in supplying the names of manufacturers of the Bearingizing tool.

L. BASSIS
Hi-Shear Rivet Tool Co.
Los Angeles

The manufacturer of the Bearingizing tool is the Cogsdill Twist Drill Co., 12950 W. 8 Mile Road, Oak Park, Mich.—Ed.

Cutting Oil Additive

Sir:

On the Newsfront page of your Jan. 24 issue you mentioned a new liquid additive for cutting oils that increases tool life up to 900 pct by virtue of the fact that it induces brittleness in the chips of the metal being cut. Can you furnish me with any more information on the product or its manufacturer?

J. T. BUNTING
Aluminum Co. of America
Pittsburgh

Further information can be obtained from the Metalloid Corp., Huntington, Ind.—Ed.

Metallizing

Sir:

We were paricularly impressed with the article "Metallizing Cuts Marine Maintenance Costs" by Capt. Fred M. Earle in your Jan. 31 issue.

We would appreciate the address of the Metallizing Engineering Co., Inc., for more detailed information about the metallizing process.

H. D. BROWN
Superintendent
Tankage and Terminal Dept.
Stanolind Oil Purchasing Co.
Tulsa, Okla.

The address of the Metallizing Engineering Co., Inc. is 38-14 30th St., Long Island City, N. Y.—Ed.

Recovering Aluminum

Sir:

I am in need of information regarding the drying and melting of aluminum turnings. Could you please furnish me with tear sheets of articles which may have appeared in your publication covering this process.

W. C. BEERS
Bellmore, N. Y.

We have published the following articles on this subject: "Direct Extrusion Applied to Light Metal Scrap" by Max Stern, June 28, 1951, p. 71; and "Aluminum Scrap Recovery Saves 5 Million Lb" by Herbert Chase, Sept. 27, 1951, p. 94.—Ed.

MAINTAIN PEAK OUTPUT with Pheoll precision-made screws, bolts and nuts—they will speed your assembly work and improve product appearance.

INSURE PRODUCT PERFORMANCE with Pheoll quality screws, bolts and nuts—standardize on these dependable industrial fasteners.

HUGE MANUFACTURING FACILITIES assure rapid production of both standard and special fasteners.

SINGLE SOURCE OF SUPPLY for screws, bolts and nuts in different sizes, types and metals.

OVERNIGHT DELIVERY to principal cities from centrally-located Pheoll factory and warehouses.

FACTS ABOUT Pheoll YOU SHOULD KNOW

- One of the nation's leading producers of industrial fasteners.
- Pheoll products are widely used in part assembly when quality is of prime importance.
- Men who produce Pheoll industrial fasteners are highly trained and experienced craftsmen.
- All products are manufactured under rigid quality control standards.
- Constant product inspection from laboratory metal analysis, through production and final finish is your assurance of precision made, trouble-free screws, bolts and nuts.

Write for this free Bulletin

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Industrial Fasteners and Metal Stamping

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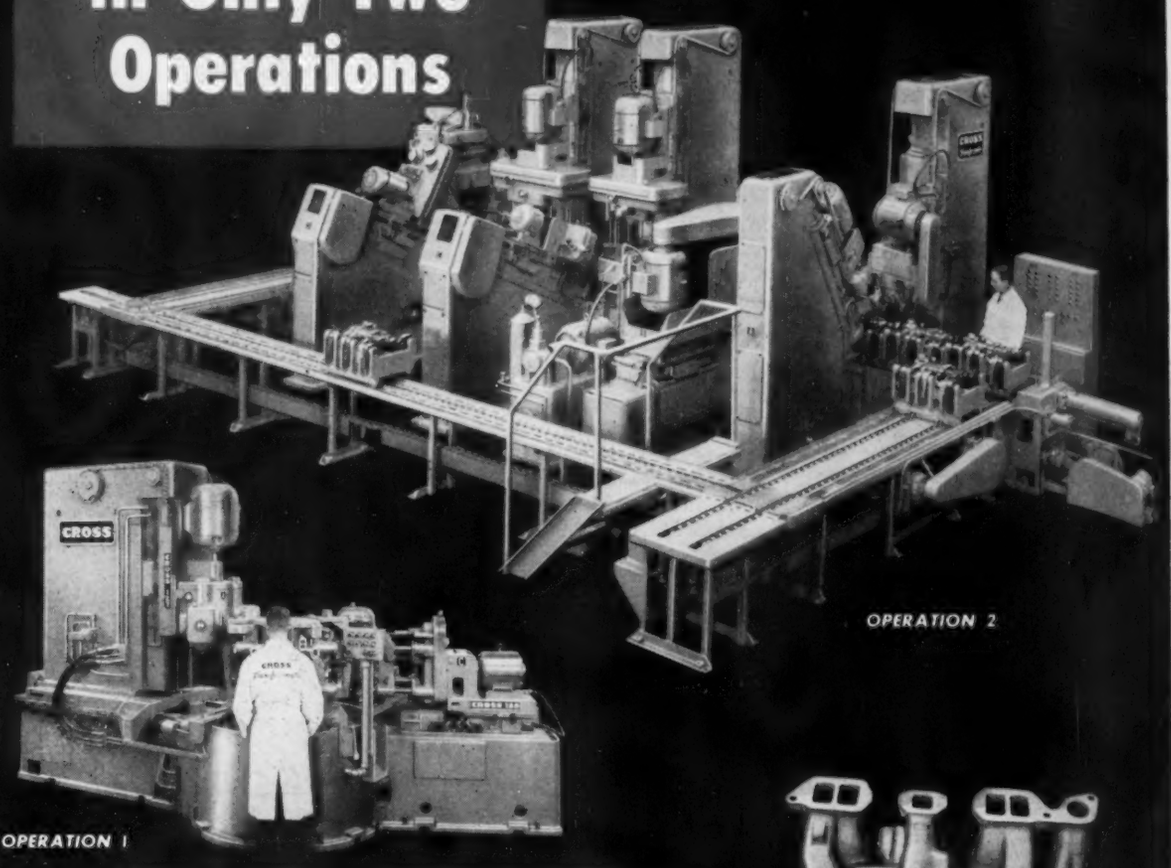
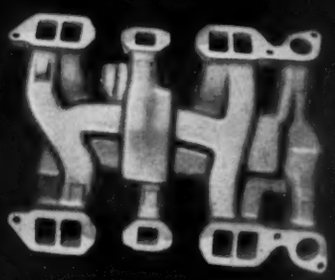
More Specials by Cross



OPERATION 2

OPERATION 1



- ★ Operation 1: Mill angular mounting pads and drill mounting holes.
- ★ Operation 2: Mill choke pad, carburetor pad and water pipe connection; bore water hole and carburetor holes; drill, chamfer, ream and tap all other holes.
- ★ 50 pieces per hour at 100% efficiency.
- ★ J.I.C. standard construction; stranded wire electrical installation; automatic chip disposal; preset tools and Toolometers to reduce downtime and speed tool changes.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► An aluminum continuous casting unit on the West Coast is now in production on continuous cast slabs up to 7 in. wide by 55 ft long. Speed ranges from 4 to 15 ft per min. The slabs are cut, reheated and rolled into strip. So far, most of the product has gone into venetian blind slats.

► In their efforts to switch to substitute steels some steel users have turned to the new TS 4140 series. It is believed that many, seeing the familiar number, didn't realize that the "TS" means a considerable reduction in alloys.

But a number now regret the selection. Research indicates that this "slide rule" steel is excessively brittle at practically all hardnesses. Some of the boron steels would have proved a far better alternate.

► Molybdenum is now being successfully cast into 1000-lb ingots. Molybdenum extrusions made by the Sejournet process show considerably better physicals than have been obtained in the same metal when forged.

► Soon to be installed in the plant of a leading forging manufacturer is a 1600-ton screw press. Widely used in Europe for high speed accurate forging, this type of machine is said to combine the speed of a hammer with the dwell of a hydraulic press. There is no possibility of the slide locking or damaging the dies.

► An interesting technique used in Detroit in making mockups simulate the real thing is the use of vacuum plating on plaster of paris ornamental features. Production use of vacuum plating, now confined to just a few firms, is expected to rise sharply because of plating metal shortages and rising cost of labor for buffing and finishing.

► The Navy now has a new wide-temperature-range grease (copper phthalocyanine) which is good from -80° to plus 400°F. Tests indicate it will operate satisfactorily for 1000 hr at 425°F.

This should be particularly appreciated in Korea, where details have had to stay up all night to keep guns and small arms workable in case of a sudden need for fire.

► Plastic piping will be installed in new minesweepers. The material, a synthetic resin bonded fiber glass cloth, has been tested for 8 months aboard a destroyer escort. Leaks can be patched with fiber glass tape impregnated with a synthetic resin.

► A recent study by the Bureau of Standards using heavy hydrogen as a tracer indicates that water in the frit is largely responsible for hydrogen-produced defects in porcelain enamel. Use of water-free frit will stop the trouble, which shows up in the form of blisters during the firing. Hydrogen for the test was supplied in the form of deuterium (heavy water).

► Possibility of big government stockpiling of machine tools is expected to add more steam to machine tool builders' arguments for accelerated depreciation. Theory is that industry would buy more under a realistic depreciation setup and take some of the load off the government--and the taxpayers.

NEWSFRONT — NEWSFRONT — NEWSFRONT — NEWSFRONT

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News Section

ALCOHOLISM: Costs Industry Too Much

Compulsive drinkers give business $1 billion hangover each year . . . Industry starting reclamation programs . . . Con Ed reports on its plan . . . Medical care essential—*By G. G. Carr.*

Alcoholism is costing American industry an estimated $1 billion each year. A plant of 1500 employees will average about 60 problem drinkers. Cost in terms of decreased productivity, higher accident rates, absenteeism and tardiness leaves business with a real hangover.

Special tragedy is that most of these problem drinkers are in the early or middle stages of alcoholism, and in most cases are readily helped. They are to be found at all job levels. The Skid Row derelict is rarely a direct problem to industry.

An increasing number of corporations, appalled by this waste, human and material, are establishing programs to reclaim the problem drinker—who has been called the hidden man on the production line. These programs are not aimed at involved psychiatric analysis (rarely necessary) but rather at "getting Charley back on the job."

Results Vary—Satisfactory recovery of cases treated under existing programs ranges from 40 to 70 pct. Consolidated Edison Co. of New York, one of the pioneers in this field, recently reported 52 pct success in the first 30 months of its experiment. From Jan. 1, 1948 to June 30, 1951, 135 employees were given "final warning" for drinking. Seventy-one were finally reclaimed, 53 responding quickly to comparatively simple methods.

Eighty-two of the first offenders repeated their drunkenness. Eighteen were retired because of age and length of service. Thirty-seven more were discharged without pensions but with severance pay over a lesser period. Nine more, several of whom had severe psychological disturbances, were discharged. Eighteen of the repeaters responded to more intensive treatment and were included in the final total of 71 returned to their jobs.

Dr. S. Charles Franco, associate medical director of the company, reported that the 53 who responded readily were "the chronic excessive drinkers without phychological maladjustment, reactive alcoholics (who use drinking as a means of adjusting to a severe emotional shock), and less serious psychoneurotic alcoholics."

They're Sick—Dr. Franco made his report at a conference on alcoholism in industry sponsored by the Institute of Industrial Medicine of New York University-Bellevue Medical Center and held in University Hospital, New York, last week.

He and other speakers stressed that the alcoholic, whether his drinking has mental or physical causes, is a medical problem. He must be treated from a medical standpoint. Businessmen supervising rehabilitation campaigns should not bother with "wet" or "dry" controversies. Nor should the program be used for gathering evidence for disciplinary actions.

Con Ed believes that its policy of identifying the problem drinker and referring him to appropriate agencies is sound. Some firms attempt treatment within their organization, including in-plant chapters of Alcoholics Anonymous. This system is necessarily limited to larger companies with sizable medical departments.

Joint Clinics—For firms using the referral method, jointly-sponsored clinics may be the answer. Con Ed gave University Hospital $25,000 to start its new Consultation Clinic for Alcoholism. Both the clinic and the company look for additional support from other manufacturers in the New York metropolitan area.

Dr. Arnold C. Pfeffer, in charge

Progressive Symptoms of Alcoholism

	ALCOHOLISM	
PRE-ALCOHOLIC SYMPTOMS	EARLY STAGES	LATER STAGES
1. Gross drinking behavior 2. Blackouts 3. Gulping and sneaking drinks	4. Loss of control 5. Alibi system 6. Eye-openers 7. Drinking alone - "loner" 8. Changing the pattern 9. Anti-social behavior 10. Loss of friends - jobs 11. Hospitalization	12. Benders 13. Tremors - "shakes" 14. Protecting supply 15. Unreasonable resentments 16. Nameless fears-anxieties 17. Collapse of alibi system (admission to self that drinking is beyond control)

Source: Yale Center of Alcohol Studies

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TINPLATERS: Controls Sap Their Sales

Business down "substantially" from '51 . . . Demand strong, but controls hurt . . . Worry about use of new capacity . . . Restrictions on can use cut sales—*By J. B. Delaney.*

Tinplate producers could use more business. Business is off "substantially" from 1951. The demand is there, they say, but government restrictions on end uses and exports have put a damper on the market.

Under present conditions, the producers argue, controls are no longer necessary. The Tinplate Advisory Committee has recommended to National Production Authority the lifting of controls.

With the market already soft, producers are a little anxious about new capacity scheduled to come in this year. The Fairless Works of U. S. Steel Co. is installing electrolytic and hot dip capacity of 170,000 tons. It is expected to be ready to start operating late in the second quarter. Columbia-Geneva Steel Co., another subsidiary of U. S. Steel Corp., is scheduled to start up new electrolytic capacity at Pittsburg, Calif., early in the second quarter. Kaiser Steel Co. is expecting to bring in 200,000 annual tons of electrolytic capacity in the second quarter.

Drop Expected—The mills last year shipped a record 5.6 million tons, or 120 million base boxes. The industry ran at full capacity. This year, with capacity scheduled to rise to an approximate 136 million base boxes, the outlook at present is for a decline from 1951.

In its effort to conserve pig tin, NPA has imposed restrictions on some end uses of tinplate. Restrictions on general line cans range from 70 to 90 pct of the base period. This covers such end uses as beer, coffee, and pet food cans. The industry argues these industries would use more cans if they were permitted to do so.

Export markets could take up some of the slack, but this outlet, too, has been restricted. Overseas shipments for the second quarter are limited to 120,000 tons of primes and 75,000 tons of secondary (including mill accumulations).

May Be Easier—The industry is hoping for lifting of controls, at least on secondary mill products. A start in this direction was permission to non-seasonal food processors (baked beans, spaghetti, soups) to increase consumption from 90 pct of their base period to 100 pct.

Other signs of an easier market to come: Quartermaster Corps is asking that less food be set aside this year than last for the military, reports in some sections of the country of price-cutting in canned goods, and a possible forerunner of a lesser demand for cans.

Also, the can companies are not buying as much as they normally would due to the 45-day inventory restriction. There is a possibility of an easing of limitations.

STEEL: Output of Ingots, Casting Up in January

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total			
1951	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Calculated Net Tons Weekly	No. Weeks in Month
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,209	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,928	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quarter	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
June	7,667,811	102.3	403,001	87.1	586,148	94.3	8,656,960	100.9	2,017,939	4.29
2nd Quarter	23,596,242	103.9	1,204,123	85.9	1,791,615	95.0	26,591,980	102.2	2,043,965	13.01
1st 6 Months	46,436,361	102.8	2,370,886	85.0	3,464,656	92.4	52,271,903	101.1	2,020,361	25.87
July	7,704,433	99.8	411,599	86.4	563,215	87.9	8,679,247	98.2	1,963,631	4.42
August	7,693,322	99.4	436,822	91.5	603,448	94.0	8,733,592	98.6	1,971,465	4.43
September	7,652,167	102.4	404,726	87.7	598,004	96.4	8,654,897	101.2	2,022,172	4.28
3rd Quarter	23,049,922	100.5	1,253,147	88.5	1,764,667	92.8	26,067,736	99.3	1,985,357	13.13
9 Months	69,486,283	102.0	3,624,033	86.2	5,229,323	92.5	78,339,639	100.5	2,006,709	39.00
October	8,027,006	103.8	458,128	95.9	631,000	98.3	9,116,134	102.9	2,057,818	4.43
November	7,749,190	103.4	411,954	89.1	632,507	101.8	8,793,651	102.5	2,049,802	4.29
December[1]	7,884,146	102.1	396,831	83.3	604,152	94.3	8,885,129	100.6	2,010,210	4.42
4th Quarter[1]	23,660,342	103.1	1,266,913	89.4	1,867,659	98.1	26,794,914	102.0	2,039,167	13.14
2nd 6 Months[1]	46,710,264	101.8	2,520,060	89.0	3,632,326	95.4	52,862,850	100.7	2,012,282	26.27
Total[1]	93,146,625	102.3	4,890,946	87.0	7,096,982	93.9	105,134,553	100.9	2,016,390	52.14
1952										
January[2]	8,066,000	100.5	407,000	89.3	627,000	89.9	9,120,000	99.1	2,059,000	4.43

Note—The percentages of capacity operated are calculated on weekly capacities of 1,816,637 net tons openhearth, 102,926 net tons Bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of January 1, 1952 as follows: Openhearth 94,973,780 net tons, Bessemer 5,381,000 net tons, Electric 8,232,890 net tons, total 108,587,670 net tons.

[1] Revised. [2] Preliminary figures, subject to revision.

Continued

of the clinic, pointed out that this system preserves the patient-doctor relationship. Alcoholics are just as sick as diabetics and tubercular. They need sympathy and understanding just as much. Because of the fundamental messiness of their problem they rarely get it.

The clinic technique uses all helpful methods of treatment. Chemical, psychiatric, both individual and group, and medical therapy, including hospitalization if needed, are all available. Referral to Alcoholics Anonymous is most helpful in many cases.

Dr. Selden D. Bacon, director of the Yale University Center of Alcohol Studies, emphasized the importance of identifying the problem drinker and persuading him to accept treatment. Once established, the industry program encourages potential alcoholics to come forward. In many cases drinking is not yet seriously interfering with their work, but is still a problem to them. Early treatment can avoid real trouble later on. And both the worker and industry benefit.

BORON STEEL: Can You Use It?

Industry hasn't accepted it with open arms . . . Some are enthusiastic but most don't know enough about it, won't try it . . . List case histories, limiting factors—*By K. M. Bennett.*

What's happening to boron steels?

Despite alloy shortages, these steels are most often eyed askance. Commented one user tartly, "If there wasn't a national emergency, I wouldn't have a pound of the stuff in my plant."

Conversely, the Boron Committee of the Society of Automotive Engineers, with the American Iron & Steel Institute, meets regularly. Boron Committee meetings have been drawing a constantly larger number of users and potential users. And some enthusiastic users see ever-growing applications.

Defense Stimulus—Use of boron steels has increased from an estimated 26,000 tons in August to about 50,000 tons in February. One thing now seems certain. Boron steel acceptance will expand—but slowly. Only a much stiffer defense shortage could speed the progress. This is not imminent now.

But to most firms, boron steel is a cat in a bag. Three factors limit the spread of boron steel use: (1) Potential users are reluctant to work with an unaccustomed metal while their accustomed materials, however scarce, can still be found; (2) warehouses hesitate to stock more than sample amounts of a metal not regarded with any particular warmth by buyers; (3) some would-be users and sellers are holding back because they feel boron is not fully tested, is a "tricky" metal, would be dangerous in a smaller plant where full time metallurgists are not checking the product, particularly in the heat-treating stage; or where post-heat treatment distortion could inflate costs.

Tentative Tries—All of which make samples, and sampling, of boron steel uncommon. Warehouses and mills report tentative dabs by industry — paperweight-sized orders of even 6 in. or 6 ft of bar stock. One producer is shipping sample lots up to 1 ton, but the total volume is small. Illustrating the suspect reputation of boron steel, two large suppliers will stock boron steels, but will request field reports from users.

Boron is being used in quantity by only a handful of industries. After popping up from hiding in World War II and gain in 1950, it's now being used in plow and harrow disks, springs for watches and springs for trucks, studs, bolts, diesel crankshafts, screws, gear trains, axle shafts, tractor transmissions, aircraft engines.

As examples, here are five case histories in the boron story:

One: This plant began using boron steels 51B60, 50B60, 80B50, and 80B55 in the manufacture of hot-formed helical compression springs from ½ in. to 2¼ in. round. Boron steel comprises 50 pct of the total alloy steel used by the plant. If chrome went tight, the plant could go to 100 pct boron steel.

The materials are not ordered to a firm hardness band, but to a desired minimum. Because of preheat treating softness of boron, the plant reports greater ease in working the metal before treating. Their use of boron cannot be expected to expand greatly.

Two: A large consumer, using 9000 tons of alloy steels monthly, is taking 63 pct of this amount in boron steel, the largest portion of which goes into truck leaf springs, followed by axle shafts. No great expansion of boron use is expected here. The 50B series are a major tonnage of the boron steel ordered. The user is well satisfied, though he has found that carburizing grades are showing considerable distortion.

Three: This user employs 50B37 or 50B40 in studs, bolts, and screws, as a substitute for 1335 and 3135, uses 80B40 in transmission gears. An order for considerable additional tonnages of boron has been placed.

His reaction: that his plant "has been able to make application of boron steels without any appreciable distress." When other steels

Possible Aircraft Boron Steel Alternates

American Iron & Steel Institute	Proposed Aircraft Material Standard	Replacement for AMS	Replacement for AISI
43BV10[1]	6266[4]	6260 6263	9310 9315
81B30	....[2]	6280 6370	8630 4130
81B40	6321[4]	6320 6322 6323 6382	8735 8740 (bar) 8740 (tube) 4140
94B15[1]	....[2]	6270 6290	8615 4615
94B17[1]	6275	6272 6274 6292 6294	8617 8620 4617 4620
98B37	6421[3]	6413	4337
98B40 mod.	6422[3]	6415	4340

Note:
[1] Carburizing grade.
[2] Insufficient information available to establish spec.
[3] Approved for final processing leading to publication.
[4] Published.

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are available, he will return to standard steels. To him, boron is and will remain, an emergency steel only.

Four: A metallurgist here indicates that boron steels are excellent in their proper uses. But in carburizing steels, boron is a troublemaker. For that reason, some of the 80B grades are being eliminated. His company continues to be a large user of boron steel.

Five: A producer of boron steel hit quantity production in June of '51. Of 3000 monthly production tons, roughly 2800 go to a single large consumer, the remaining 200 monthly tons to outside consumers. Some 50B20 is sold, but more in 50B40, 50B50, 50B60, which seem to be more free of distortion. A restricted range of sizes is offered. Orders have been climbing "slightly." Wider boron use is predicted.

From this cross-section and other statements by steelmen, several conclusions might be drawn.

There are three groups in the boron picture. First are the metallurgists. They like to see metals properly used, they like metals per se, they like boron steel. The metallurgists tend to be more enthusiastic about increasing use of boron steels and see a brighter future for the metal.

Second group are the enthusiastic users of boron. They like boron steel, know how to use it, think that its uses could be extended, plan to make some extension of its use in their own plants. But their numbers are small when compared with the third group, which constitutes just about everyone who uses steel.

Among the latter, emotions range from guarded curiosity to frank distrust.

More at Warehouse — Another conclusion: that boron stocks will increase at the warehouse level. To date, most purchases have been made directly at the mill. But there will be no great variety of sizes immediately available. Larger suppliers will continue to collect consumers' data on the boron steels they ship.

Some steel users who switched to the new TS series in their efforts to find substitute steels now regret the move. Research indicates that this "slide rule" steel (alloys are considerably reduced) is excessively brittle at practically all hardnesses. One of the boron steels might have proved a far better alternate.

The Air Force has a large boron research program underway. But, because of its late start, and time consumed catching up with industry research and use, much of the urgency may be gone by the time this program is advanced to the useful stage.

Boron steels in carburizing applications, specifically 80B15, 80B17, 80B20, and 80B25 may disappear from the scene because of nickel shortage and some bad experience with distortion. Boron steels 50B00 and medium carbon grades 80B00 and 81B00 will grow.

SCRAP HUNTERS: Shakeproof, Inc., division of Illinois Tool Works at Elgin, Ill., recently called on its own employees for aid in combing the Elgin area for scrap deposits. Employees were paid for the scrap they located, and ardent amateur scrap hunters dumped 106 tons of the scarce raw material at the company's scrap heap, pictured above.

Steel Softening?

Backlogs of non-integrated mills shrink—conversion disappears.

Non-integrated steel producers are now feeling the effect of the softening steel market. Conversion, once available for the asking, has gone out the window completely for several months.

These producers are eating rapidly into once-robust backlogs. A converter of hot-rolled strip in western Pennsylvania is booked ahead 2½ months, compared with a former backlog of 1 year. Conversion business has disappeared. Last year it accounted for 25 pct of his volume.

Another converter reports that his first quarter this year will be good, but he is pessimistic about the second quarter.

Beating Bushes—The converters are out beating the bushes for sales—and are not finding the going too good. Last year their problem was finding sources of hot-rolled strip to convert. This year the hot-rolled is available, for some at least, but sales are out. Follansbee Steel is an exception. It complains of a lack of hot-rolled strip.

Cutbacks in automotive and appliance production hurt most. The integrated mills are now able to supply these consumers, who once leaned heavily on the converters to supplement mill deliveries.

STEEL: Tempers Flare at Hearings

Murray boils over at testimony . . . Later transfers charges from witness to industry leaders . . . Ore witnesses cite rising costs . . . Expect new strike deadline—*By W. V. Packard.*

Sharp clashes of temper interrupted the monotony of the steel wage hearings in New York last week. But tempers were about all that reached the breaking point as the wage-price impasse remained intact. There was practically no hope that an early agreement could be reached. Although the hearings were in New York, all eyes were trained on Washington from where it was felt the solution would come.

The temper came mostly from United Steelworkers' President Phil Murray who was roused by testimony of U. S. Steel Co. Economist Brad Smith against guaranteed annual wage demands.

In his testimony, Mr. Smith referred to the steelworkers' union as "the Economic Royalists" in the hierarchy of American workers. He said this was a fact their leaders readily acknowledged and for which they even claim credit—except when they are asking for still higher pay.

He said that steel is fast becoming a push button industry, requiring less and less hard physical labor from its employees.

Name-Calling—His statement brought Mr. Murray to his feet with a blast of invective that charged the Bar Assn. assembly room with tension. In red-hot anger, he charged, "this piece of paper . . . is the most reprehensible, filthy, lying, deceiving presentation . . . ever presented to a government agency in my lifetime."

This was followed by an exchange of barbs between Mr. Murray and Mr. Smith, finally interrupted by John Stephens, U. S. Steel vice-president. After Mr. Murray had left the room Mr. Stephens suggested that Mr. Murray might like to have deleted from the record his "unworthy statements directed at Mr. Smith."

Mr. Murray didn't exactly do that. But the following day he said he was willing to withdraw from the record any personal reflection on Mr. Smith and put responsibility on steel leaders.

Diverting Tactic—Mr. Murray's blast of temper did draw attention away from other testimony by Mr. Smith in which he pointed out that the union has fixed $59 a week as suitable—tax free—income for the unemployed. Against that, he said "I would place the figure of $58.69, which is the average weekly earnings—before taxes—of all wage earners in nondurable goods manufacturing industries during November, 1951, as compiled by the Bureau of Labor Statistics."

Charles White, president of Republic Steel, warned that any raise in wages would have to be accompanied by a raise in prices. Citing unwillingness of consumers to buy higher priced steel today, he expressed fear that consumer resistance would grow as a result of an enforced price increase.

Robert C. Tyson, vice-president and comptroller of U. S. Steel, expressed similar fears. Another way to meet the total cost increase of $1.14 per manhour would be to use all money now going for expansion, dividends and taxes, he said. A third method, he declared, would be to produce and sell more steel with the same number of manhours of production, a possibility "the union has at no time suggested."

THE BRASS: Three steel industry executives get together at Wage Stabilization Board hearings on steelworkers' wage demands in New York. Left to right: Thomas F. Patton, vice-president and general counsel, Republic Steel Corp.; Charles M. White, Republic president; and John A. Stephens, U. S. Steel Corp. vice-president and chairman of the steel companies' coordinating committee.

Ore Mine Costs—Alexander C. Brown, president of Cleveland-Cliffs Iron Co., said higher labor costs of iron mines might well discourage greatly needed development of new domestic mines and taconite beneficiation plants.

This, he said, would leave the nation more dependent on foreign ores which could be cut off in war.

He presented testimony to show that mining costs have already been rising at an alarming rate.

Turn Page

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Financial

LOANS: Washington Will Help You

Government financing helps business expand . . . Defense contractors can get loans and guaranties for new facilities . . . Several methods are now available—*By G. E. Rosden.*

Lack of surplus capital is a traditional obstacle to expansion by small business. Inflated costs have made this lack particularly acute in the rearmament period, when new facilities are needed most. Three kinds of government aid are provided to overcome this handicap: Tax relief, pricing relief and government financing.

Of the three, government financing is easily the most important. The Defense Production Act au-

George Eric Rosden is an attorney-at-law with offices in Washington.

thorizes the President to make loans for new facilities necessary to defense. Loans may be made only if not otherwise reasonably available.

Loans — Applications for loans should be filed simultaneously with those for fast tax write-off certificates of necessity. Facts needed and processing time are about the same. But granting of loans often reduces percentage allowed for fast write-offs.

Each application (usually on Form NSRB—146) should be forwarded to the appropriate "guaranteeing agency." The Army, Navy, Air Force, Commerce, Interior, and Agriculture Depts., General Services Administration, Atomic Energy Commission, and Defense Materials Procurement Administration have been so designated.

The agency of "primary interest" will process the application and forward its recommendation or "guaranty" to Defense Production Administration for issuance of a "Certificate of Eligibility." (DMPA has authority to issue this for metals and minerals.) Then Reconstruction Finance Corp. must make the loan.

War Powers Act — Loans may also be obtained under the First War Powers Act. At present, the Defense, Commerce, and Agriculture Depts., Atomic Energy Commission, National Advisory Committee for Aeronautics, Government Printing Office, General Services Administration, Tennessee Valley Authority, Federal Civil Defense Administration, and Defense Materials Procurement Agency are authorized to make loans under this act.

This authority is used basically to finance government contracts. Theoretically, it may be used also for new facilities, but budget trouble usually prevents this.

RFC—Regular RFC loans are another possibility. Main difficulty is that these loans are not meant to apply to emergency expansion. Though designed to encourage business, RFC requires that projects be beyond the plans stage and that there be full collateral. Also, recent events have made RFC very coy.

The Defense Production Act allows the President to guarantee loans for working capital for new

Labor

Continued

Since 1939, open-pit mines have shown a decrease in productivity of 33 pct, while that in underground mines rose only 0.4 pct.

Postpone Strike?—Other important developments were: (1) Phil Murray will call a meeting of the union's 170-man wage policy committee in Pittsburgh this Thursday. It is expected that they will authorize a postponement of the strike deadline from Feb. 24 until sometime in March to give the Wage Stabilization Board more time to make its recommendations.

(2) The WSB wage panel may be instructed to confine its report to a statement of facts without any recommendations. This would leave the recommendations up to the 18-member board of labor, public and industry members. Industry views this possibility with alarm, since its members have been consistently outvoted by a coalition of other members in previous tests.

Mr. Murray doesn't seem to be in such a pressing hurry to reach a final settlement as he was a few weeks ago. Some observers speculated that this might be because he expects settlement to include a wage boost that is retroactive, but a price boost that is not. Thus, delaying final settlement could be a means of whittling the price relief steel companies are granted.

or expanded plants. The act is sufficiently pliable to permit such loans for new facilities if the applicant has a government contract requiring such facilities. Commerce Dept. has set up a board to approve applications. Here again, DPA issues a certificate of eligibility.

RFC loans are also newly authorized for small defense plants (less than 500 employees). Application goes to Small Defense Plants Administration, which recommends the loan to RFC.

Guaranties — Government guaranties are usually preferable to all types of direct loan. Most businessmen would rather deal with their own banks than wander in the maze of government procedures. Government economists feel that guaranties are less inflationary than loans, but issuing agencies prefer loans. Most agencies haven't even issued regulations on guaranties.

Applications are made to the appropriate agency of primary interest, with Federal Reserve Banks acting as financial agents. After making sure that the primary agency will give the guarantee, the bank making the loan applies to its district Federal Reserve Bank.

To Washington — The application is then forwarded to the Federal Reserve System's Board of Governors in Washington. After conferring with the guaranteeing agency, which in turn needs DPA approval, the FRS Board authorizes the local Federal Reserve Bank to execute the guaranty. These guaranties are at present widely used only to guarantee loans for working capital (through the Commerce Dept.).

Stockpiling is a third method of financial assistance. Contracts for strategic materials as determined by the Munitions Board are let by GSA to producers. Contracting period has now been extended to June 30, 1962. Advance payments for so long a period will often give the contractor the capital he needs for expansion.

Raw Materials

TACONITE: New Project Enters Race

Erie Mining plans $300 million taconite iron ore plant in Minnesota . . . Applies for certificate of necessity . . . Eventual capacity will be 10.5 million tons—*By Gene Beaudet.*

After years of painstaking research the steel industry is starting to back up with cash its conviction that commercial beneficiation of taconite ore is economically feasible. Early this week Erie Mining Co. announced its intention to spend $300 million on a project in Minnesota for the eventual yearly production of 10.5 million tons of iron ore pellets from taconite.

The race for large scale taconite beneficiation is expected to be one of the most outstanding characteristics of the steel industry for this decade. Underlying causes for the great rush to taconite are the steady draining off of high grade ores from the Lake Superior region and the necessity of not becoming too dependent on foreign ores in the event of a future war.

In this latest development in the taconite picture, Erie Mining Co., owned jointly by Bethlehem and Youngstown Sheet & Tube, has applied for a $300 million certificate of necessity covering the entire project. This will include construction of a plant on the Mesabi Range, northeast of Aurora, Minn., to produce the concentrated iron ore pellets.

As A Start—First unit of the project, if given government approval, will have an annual capacity of 5 million tons within 4 or 5 years. Present plans call for the construction of additional units until the full capacity reaches the 10.5 million ton yearly mark. The program also includes building of a large power plant and railroad to carry pellets from the plant to docks at Two Island, Minn. as well as construction of a new community east of Aurora to house workers and their families.

"What do you mean I'm wasting motion? I have a date every night, don't I?"

Reserve Mining Co., owned by Republic and Armco took the lead in commercial taconite beneficiation last fall when it awarded a $75 million construction contract for the building of a beneficiation plant at Beaver Bay, Minn.

Scheduled for completion in 1955 the plant will be capable of turning out 2.5 million tons of concentrated pellets per year. Ten million tons is possible later.

Can Compete—Reserve believes it will be able to produce beneficiated taconite ore competitive with other Lake Superior ores. They are presently re-equipping a 300 thousand ton a year plant at Babbitt, Minn., and expect to have it in operation early this year.

Erie Mining Co.'s pilot plant at Aurora, Minn. last year produced and shipped about 70 thousand tons of pellets and so far it is claimed is the only plant which has produced large tonnages of pellets from Lake Superior taconite.

U. S. Steel—Third big factor in the taconite contest is U. S. Steel Corp.'s subsidiary, The Oliver Mining Co. The firm is building a 500-thousand-ton-per-year pilot plant at Iron Mountain, Mich. This plant is expected to be in operation the early part of next year.

For another aspect of the taconite situation the beneficiation of lower grade non-magnetic ore will be attempted commercially by Ford Motor Co. and Cleveland-Cliffs Iron Co. at Humboldt, Mich.

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QUOTAS: You're Not Getting Much

Revised allocations don't mean any real changes in non-defense production . . . Less than 1 pct of controlled items involved . . . Larger allocations given for some hard goods.

Revised allocations of controlled materials for April-June distribution will not lead to "significant changes" in the level of civilian goods production.

Defense Production Administrator Manly Fleischmann warns businessmen that his agency's adjusted apportionment of aluminum, copper products, and steel involves only about 1 pct of these scarce items. Civilian industry will get, in addition to the second quarter allocations announced last month, 2250 tons of aluminum, 1750 tons of copper and copper base alloys, and 35,000 tons of steel, mostly carbon.

Turnbacks — A DPA special-adjustment reserve, plus turnbacks of 5700 tons of aluminum and 4834 tons of copper-containing materials by the military, makes possible revision of the earlier allocation.

The agency announced early in February it was turning over 500 tons of aluminum to assist the ailing automobile industry.

Venetian-blind manufacturers, and producers of such "less essential" items as lampstands and costume jewelry, stand to gain safer footing because of the adjusted apportionment. DPA has earmarked 500 tons for manufacture of blinds, in answer to hardship appeals.

Many firms in this field had reported themselves on the verge of failure, with aluminum allotments as low as 10 or 15 pct of pre-Korean requirements.

More Appliances?—An upward revision is now expected in the government estimate that production of such consumer hard goods as washing machines, refrigerators, and similar household items in the second quarter would be reduced to about 45 pct of pre-June, 1950, levels. Another 500 tons of aluminum for this field also appears in the revised allocations.

Manufacturers of general industrial equipment are in line for the same additional amount of aluminum, boosting their second-quarter total to 8185 tons. Small amounts from the reserve supply will go to producers of farm machinery, plumbing supplies, chemicals, and communications items.

Freeing of Foreign Lead Asked

National Production Authority is studying recommendations by industry to the effect that allocation controls over foreign pig lead be revoked except for inventory and end-use restrictions.

Definite action is expected following an industry advisory committee meeting later this month.

Industry's view is that the expected suspension of import duties, already approved by the Senate, will further boost the now increasing supply from other countries.

Settlement of labor trouble now indicates the smelting of 46,000 tons in March, industry spokesmen said. The outlook indicates that even without tariff removal, five nations alone will ship to the U. S. 17,000 tons monthly.

"It's that new NPA man. He believes in surprise inspections."

SSB Authorizes Welfare Plans

Health and welfare plans in which company employees pay at least 40 pct of the gross cost of benefits are authorized by the Salary Stabilization Board.

The board recently issued General Salary Order 11, which permits operation of such plans without prior approval of the Office of Salary Stabilization, provided they do not include benefits for employees' dependents.

Conditions—In addition, the order states that health and welfare plans providing coverage of disability, hospital expense, surgical expense, and related items may be put into effect without prior approval if:

1. The plan covers both wage and salaried employees under the same or similar terms.

2. It extends an existing plan to additional employees within the same plant or to similar groups of employees in other plants under the same employer.

3. It extends or renews a plan in effect on Jan. 25, 1951, or approved by the Wage Board prior to last May 10, or by Office of Salary Stabilization thereafter.

4. It is a new or amended plan required by law.

Industry Controls This Week

Chemicals—Amend. 5, SR 7, CPR 22 grants chemical manufacturers alternate methods of computing cost increases when applying for Capehart adjustments.

Hardware—SR 22, CPR 22 provides manufacturers of builders' hardware with ceiling price formulas based on GCPR provisions.

Mechanical Precision Springs, Metal Stampings and Screw Machine Stampings — Amend. 1, CPR 119 allows manufacturers of these products to price under CPR 30.

Tax Write-offs—New DPA Reg. 1 requires predetermination by DPA before starting new construction for which fast tax amortization will be asked.

Copper:

Over-allotment to wire mills may slow rather than speed output.

National Production Authority procedures on copper for brass and wire mills became the target last week for sharp criticism from the wire and cable industry.

The industry's advisory committee told officials that over-allotment of Controlled Materials Plan tickets for copper and directives for acceptance of orders up to 122 pct is more likely to delay than to speed up deliveries.

Brass mills were allotted 52,340 tons of copper for January and 46,583 tons for February. Wire mills got 57,160 and 50,872 for the same months.

March allocations are not likely to be much larger, if any, NPA predicted. Supplies of concentrates are going down and the scrap shortage persists.

Better Balance — Committee members recommended that NPA make a greater effort to bring CMP allotments into balance with estimated copper supplies and to use withdrawals from the stockpile, if necessary, to keep it that way.

There is now under consideration a uniform inventory policy for the wire and cable industry. Industry wants the same base period for inventories as that used for production directives.

NPA is also taking up the pos-

"After second quarter allocations he just doesn't care."

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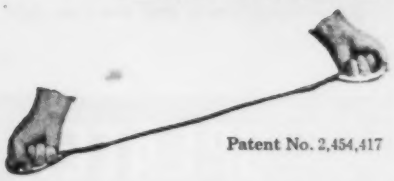

Patent No. 2,454,417

Tie a knot in a Tuffy Sling, then pull it tight with both hands and feet. See how flexible it is — and how it straightens out without damage. The secret is in the braided fabric construction — a patented Tuffy feature!

Scores of wires are stranded into 9 parts, then machine woven into an interlaced wire fabric entirely unlike conventional wire rope slings. Even cutting one of the 9 parts does not result in stranding. And eye splices develop up to 95% of the fabric strength.

11 Types of Tuffy Slings If none of the 11 factory packaged Tuffy Sling types exactly meet your needs, Union Wire Rope engineers will develop one that does. Tuffy Slings are proof-tested to twice safe working load. The safe working load is stamped on a metal band attached to each sling. If you have your own rigging loft, Tuffy braided fabric is available by the reel.

MAIL COUPON TODAY FOR YOUR FREE SLING
This special 3-foot sample is yours without cost so that you can prove to yourself the advantages of a Tuffy Sling. Just mail the coupon.

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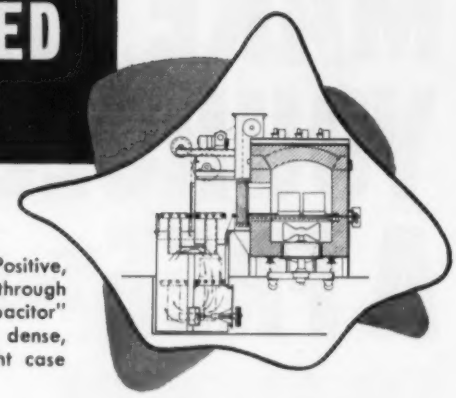

Combines the operating economies of large continuous furnaces with the flexibility of batch-type equipment. Positive, directed flow of furnace atmosphere through load, combined with the "heat capacitor" assures rapid, uniform heating on dense, bulk-loaded parts and even on light case work.

GREATER PRODUCTION

The Dow Furnace has established production records in plants throughout the country. Forced, uniform quenching from atmosphere gives full hardness, reduces distortion, eliminates decarburization. One man can operate *two* furnaces with ease, producing as much as 1500-lbs. of light case work per hour.

WIDER VERSATILITY

Whether it's gas cyaniding, gas carburizing, clean hardening or carbon restoration work, the Dow Furnace is capable of processing a variety of parts having a wide range of heat treatments. To demonstrate the close tolerances of heat treatments, send us samples of your own parts for processing.

AT LOWER COSTS

Reductions in direct labor, material handling, machining and cleaning costs, coupled with improved quality, have resulted in savings amortizing the original cost of the Dow Furnace in a few months. Gas cyanides for ¼ to ⅓ the cost of liquid cyaniding.

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sibility of a change in handling direct defense orders. It admits that the present system of handling requirements in the A-through-E rating category is working hardships on some mills and is making it more difficult to get acceptance for other equally important defense requirements.

Copper Powder Order Change Due

Regulations are expected to be revised shortly so as to permit users of granular-powdered copper to obtain their supplies through self-certification.

National Production Authority's proposed changes have been approved by the copper powder producers industry advisory committee. They would eliminate much paper work.

About 4000 tons a quarter are consumed by the industry, of which close to 3000 tons go into sintered castings and lesser amounts into heat resistant bearings, brake shoes and other products.

Second Quarter CMP Exports Set

Export quotas for steel, copper, and aluminum under the Controlled Materials Plan, including quantities for manufacture of A products, were established last week for the second quarter.

Separate quotas have been set up by the Office of International Trade for each major class of CMP materials, and specified quantities have been made available under each of these quotas for foreign oil operations and other essential requirements.

Complete breakdown is given in the Current Export Bulletin (No. 658).

Cost Formula Set for Chemicals

Chemicals manufacturers can choose alternate methods of computing costs when applying to Office of Price Stabilization for adjustments allowed by the Capehart formula.

In Amendment 5 to Supplementary Reg. 7, Ceiling Price Reg. 22, OPS last week ruled that pro-

ducers may employ one of the following procedures:

1. Arbitrary distribution of allowable price increases among joint products and by-products of a single chemical process. This method is offered, OPS said, so that the price of each product will reflect market conditions.

2. Use of prices provided for in long-term sulfur contracts, as confined to computation of sulfur costs.

3. Inclusion of repair and maintenance materials costs within producers' increased-costs allowance.

Manufacturers of lead-containing chemicals may compute allowed increases on an average basis for any lead materials customarily priced by use of uniform differentials.

Cadmium Curb Lifting Planned

National Production Authority is considering revision of M-19 at an early date so as to lift some of the restrictions now imposed on the use of cadmium. Inventory control would be kept.

Revisions proposed by NPA have been approved jointly by industry advisory committees representing both consumers and distributors.

As the proposed changes now stand, the revisions would: Permit unlimited use for categories defense "A" through "E" and for Z-2 ratings; permit unrestricted use for all items now in the "permitted use" list; and permit 70 pct of base period use for all other purposes.

Oil Country Goods Priorities Set

Priorities assistance has been given 1292 oil and gas operators for a total of 282,492 tons of casing and tubing. This does not include 30,000 tons assigned for use of small operators who drill eight or fewer wells each year.

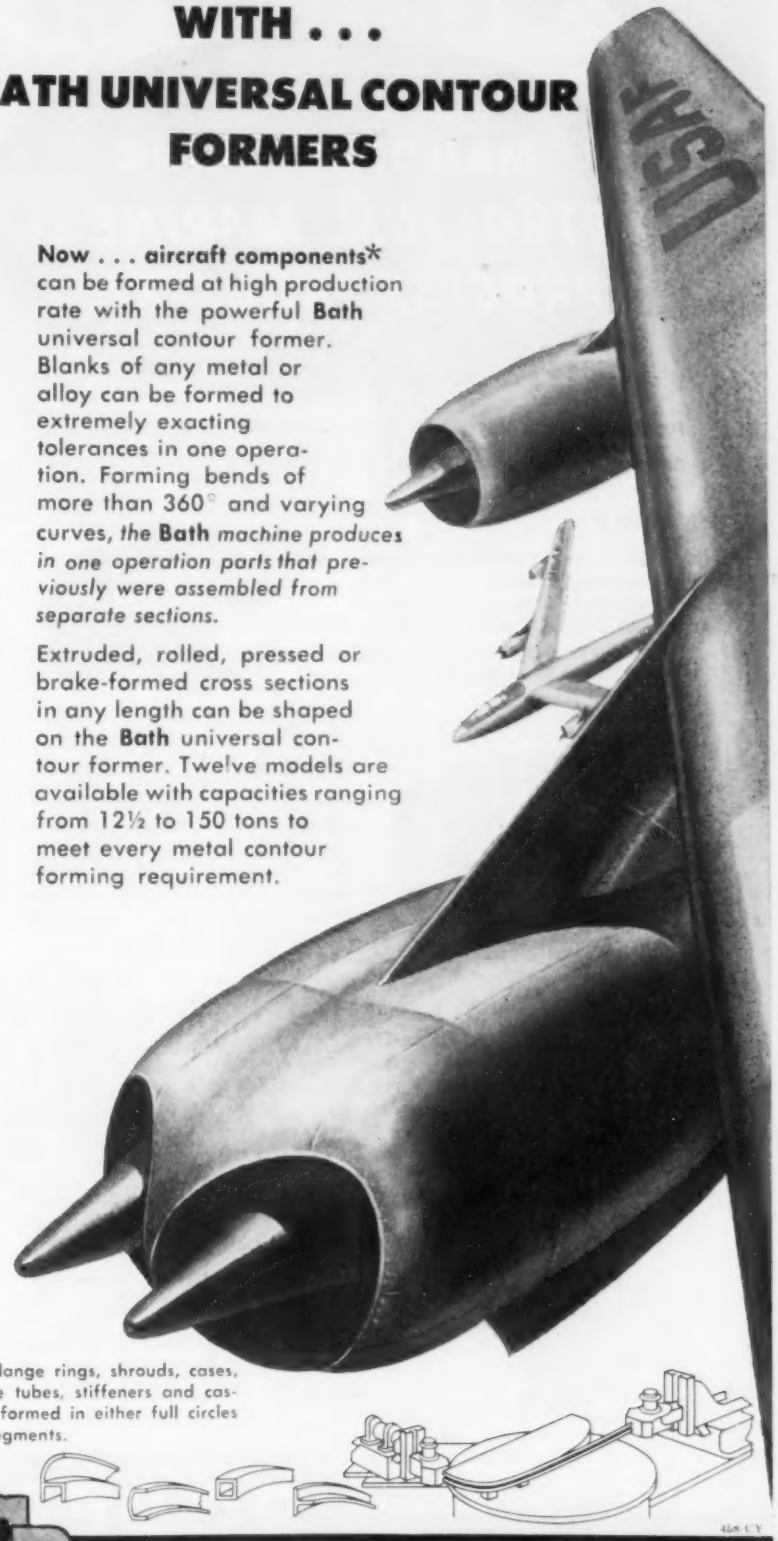
A total of 543 applications for priority assistance was turned down for ineligibility and other reasons.

Of the tonnage covered by pri-

STRETCH-FORM

FOR STRENGTH AND PRODUCTION WITH . . .

BATH UNIVERSAL CONTOUR FORMERS



Now . . . aircraft components* can be formed at high production rate with the powerful **Bath** universal contour former. Blanks of any metal or alloy can be formed to extremely exacting tolerances in one operation. Forming bends of more than 360° and varying curves, *the* **Bath** *machine produces in one operation parts that previously were assembled from separate sections.*

Extruded, rolled, pressed or brake-formed cross sections in any length can be shaped on the **Bath** universal contour former. Twelve models are available with capacities ranging from 12½ to 150 tons to meet every metal contour forming requirement.

*Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings formed in either full circles or segments.

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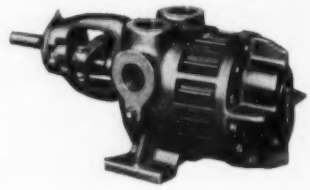
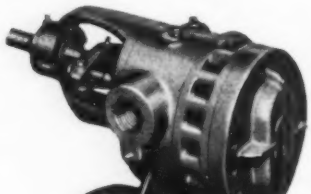
MODELS FROM 3/4 TO 300 G.P.M. — CAPACITIES TO 1000 P.S.I.

SPEEDS UP TO 1800 R.P.M. FOR PUMPING CLEAN LIQUIDS

SERIES F

Four-port design offers 8 optional piping arrangements. Equal size helical gears run in axial hydraulic balance. Standard or bronze fitted; packed box or mechanical seal. Up to 300 P.S.I.—1 to 300 G.P.M. for clean liquids.



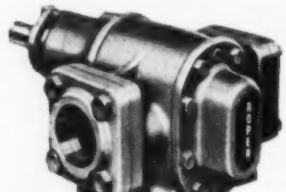


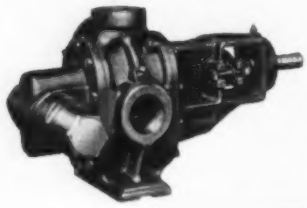
SERIES H

Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I. — 5 to 75 G.P.M. sizes.

SERIES K

For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I. — 3/4 to 50 G.P.M.





SERIES 3600

For general purpose work handling thin or thick liquids with suction lift up to 15 feet. Standard or bronze fitted; with or without built-in relief valve. Pressures to 60 P.S.I. — 40 to 300 G.P.M.

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ority applications, 197,438 tons went to "B" operators, who drill more than 40 wells a year. "A" operators, who drill less than 40, got 85,053 tons. An additional 22,500 tons were earmarked for emergency wildcat drilling by "A" operators.

These figures are not necessarily final. They are primary allotments which can later be supplemented under justification.

Steel Mill Equipment Status

"Industrial cars constructed to transport molten materials together with the necessary ladles or thimbles—variously designated in the steel industry as iron ladle cars, cinder ladle cars, cinder ladle buggies, slag ladle cars, hot metal ladle cars, hot metal mixer cars, etc.—when purchased as a complete unit, will be designated as Class A products effective with the second quarter 1952," National Production Authority said this week.

"However," it was stated further, "ladles or thimbles used to contain the molten materials will, when purchased separately for replacement purposes, continue to be considered Class B products."

This definition was given THE IRON AGE by the iron and steel division this week in order to clear up confusion surrounding reclassification of certain items of steel mill equipment.

Stable Prices Promised Smelters

Federal pricers are promising the aluminum smelting industry no changes in ceilings for aluminum scrap and secondary aluminum ingot.

Office of Price Stabilization officials and industry spokesmen recently discussed only minor changes to clarify and make more workable Ceiling Price Reg. 54, covering smelters' products. An industry group will recommend proposed changes to OPS.

Spokesmen suggested to pricers that mounted foil scrap be placed on a metallic-content basis rather than on the basis of total material weight, as Revision 1 to CPR 54 stipulates.

Defense Contracts

Plastic Pipe:

Bureau of Ships to try plastic pipe on some minesweepers . . . It's tested.

Plastic piping will be used in construction of several minesweepers the Navy is building. The switch is intended to conserve copper, brass, and nickel, and will reduce installation costs.

In each minesweeper the Navy expects to save about 2 tons of copper and nickel. In addition, savings in copper-brass piping are contemplated.

Bureau of Ships tested the plastic pipe on a destroyer escort for 8 months and reported that plastic pipe would not corrode from sea water and is resistant to shock. Sections of this material carrying salt water under pressure remained as "good as new," according to reports.

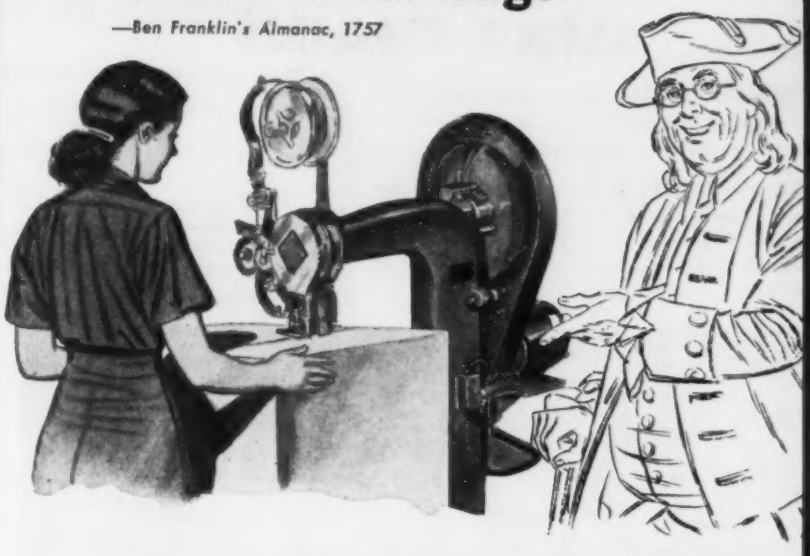
Two-in. plastic pipe one-eighth-in. thick will cost the Navy about 70¢ per ft, while copper-nickel pipe of similar size costs about $1.55 per ft and stainless steel costs about $2.25 per ft.

The Bureau of Ships expects maintenance costs to be lower. Several pieces of plastic pipe installed aboard the test vessel were placed just above the boiler drum, where the air temperature reached 180°F. After the tests were completed, the pipe was found to be unaffected by the heat.

"I'll be out of town for a few days until reaction to our price boost cools off."

"Want of care does us more damage than want of knowledge."

—Ben Franklin's Almanac, 1757

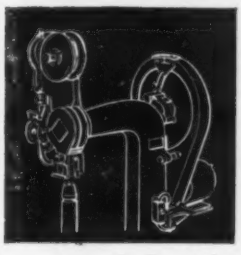


Thee can hide the fire of waste, but what will thee do with the smoke when ye Boss casts an eye on your department report?

—Acme Steel Notebook, 1951

How's *your* business? New people arriving, willing but perhaps untried? Old hands coming back and finding skills a little rusty?

Now's the time to get them off on the right foot toward increased efficiency and greater thrift. There's no better place to begin than in your packing and shipping operations. Take box stitching equipment for example. Here are five things everybody ought to know to keep Acme Silverstitchers on the job:



1. **Clean and oil every day.**
2. **Never operate stitcher without material in stitching position.**
3. **For perfect stitching, check work regularly. If in doubt about any operating difficulty, refer to service manual (additional copies sent upon request) or submit stitched material, identified by machine type and serial number, to Customer Service Department, Acme Steel Company.**
4. **From time to time moving parts need replacement—keep a supply on hand to make quick minor replacements.**
5. **Ask us about the Acme Steel "3-WAY SERVICE PLAN" for equipment repairs.**

Follow these suggestions. And ask your Acme Steel representative to work with you on ways to increase efficiency, eliminate waste and stretch the available supply of Acme Silverstitch box stitching wire. Or write Dept. IA-22.

ACME STEEL COMPANY, 2840 Archer Avenue, Chicago 8

Acme Steel employees on December 31, 1950, numbered 4,098 men and women, an increase of 8.18% over 1949. Monthly employee turnover average in 1950 was only 1.7% despite the growing manpower needs of the armed services.

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Barbed Straps — Corrugated Fasteners — Hoops — Strip Steel

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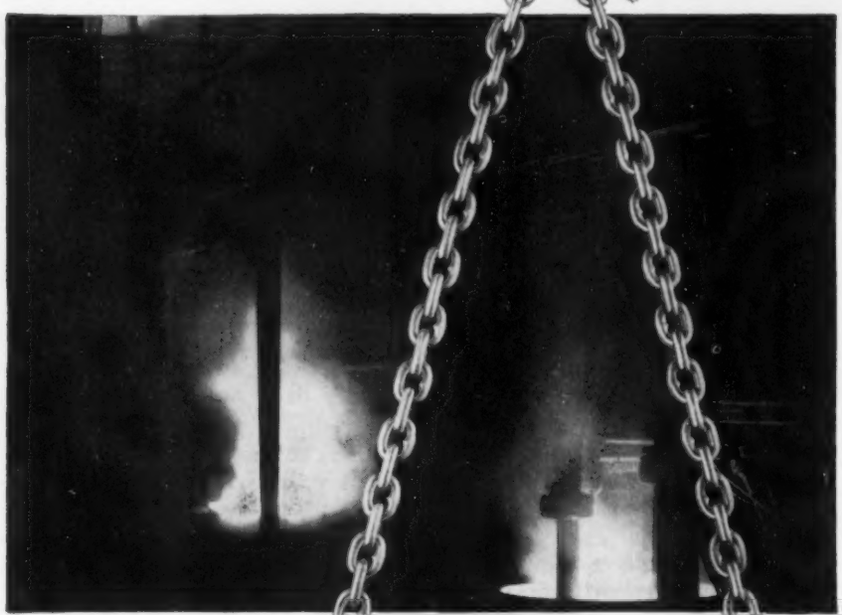
SAFETY—HERC-ALLOY Sling Chains are made to your specifications. Every new sling carries a written guarantee, is registered and tested before shipping. This registration serial number is carried at the top link.

● Serial number permanently affixed near top link for positive identification.



● Identify HERC-ALLOY by the patented Inswell side weld with the extra swell of metal on the inside of the link.

EFFICIENCY—Lighter, stronger HERC-ALLOY Sling Chains feature the exclusive short, narrow link design which holds firmer, less tendency to kink, less gouging. Workmen handle HERC-ALLOY with less effort.

PREFERENCE—Men who buy and use sling chains are influenced only by facts learned through experience. HERC-ALLOY Sling Chain preference has been built up over the years, not just by what we say, but by how HERC-ALLOY performs on the job.

Write for Data Book No. 3 which contains much useful manufacturing and application information on HERC-ALLOY Sling Chains.

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***District Offices:* New York • Chicago • Cleveland**

Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., and Johannesburg, South Africa.

—Defense Contracts—

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation, No. or proposal, and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Navy Purchasing Office, Washington

Tool set, master mechanics, 200 sets, 5867B, Mar. 3.
Dies, stocks pipe threading taps, 48,836, 5870B, Mar. 7.
Interval selector-generator, 2752, 5873A-B, Mar. 7.
Squares, machinists, 3732, 5863B, Mar. 7.
Pliers, battery, 99,586, 5866B, Mar. 5.
Trowels, plastering, 1308, 3293Q, Feb. 26.
Trucks, pallet, hydraulic, 65, 3238, Feb. 28.
Jacks, screw type, 1514, 3299Q, Feb. 27.
Scissors, electricians' shears, 31,819, 5868B, Mar. 6.
Trailers, warehouse, 13,964, 5874B, Mar. 10.
Scrapers, ship, all metal, 59,544, 5876B, Mar. 7.
Pliers, linemans wire stripping, 250,000, 3292Q, Feb. 28.
Gages, telescoping dial, 5508, 5869B, Feb. 29.
Vises, bench type, jewelers drill, 1512, 5881B, Feb. 27.
Tunnel button lug bands, 752,000, 5901A-B, Feb. 26.
Tool kits, instrument repair, 100 sets, 5847B, Mar. 5.

Detroit Arsenal, Centerline, Mich.

File hand, 14,389 ea., 52-173B, Mar. 4.
Rod assy, 2152 ea., 52-183B, Mar. 3.
Yoke assy rear brake, 4800 ea., 52-183B, Mar. 3.
Eye assy brake rod, 4820 ea., 52-183B, Mar. 3.

Watervliet Arsenal, Watervliet, New York

Steel plug, part for 60MM mortar, 2300 ea., 52-111B, Mar. 7.
Steel nut, part for 60MM mortar, 9400 ea., 52-111B, Mar. 7.
Steel ring, part for 60MM mortar, 5600 ea., 52-111B, Mar. 7.
Steel pin, part for 60MM mortar, 8800 ea., 52-111B, Mar. 7.
Steel sights, bore breech part for 90MM gun, 3800 ea., 52-117B, Mar. 7.

Corps of Engineers, St. Louis

Delineator assy road, 403,150 ea., (Eng-23-065-52-581B), Feb. 21.

Columbus General Depot, Columbus, Ohio

Spare parts for refrigeration unit 12 line items, various, 52-313B, Mar. 4.

Letterkenny Ordnance Depot, Chambersburg, Pa.

Sleeve cylinder, 5379 ea., 52-79B, Feb. 26.

Rock Island Arsenal, Rock Island, Ill.

Clip retaining assy, 550,000 ea., (11-070-52-683B), Mar. 4.
Racks arm carbine M4, 7000 ea., (11-070-52-683B), Mar. 4.

Columbus General Depot, Columbus, Ohio

Spare parts for railway equip. 47 itm, 542B, Mar. 3.

Air Materiel Command, Dayton

Container and holder assy, 7100 ea., 52-539B, Feb. 26.
Rack assy, bomb, 1000 ea., 52-545B, Mar. 7.

Signal Corps, Supply Agency, Philadelphia

Terminal box, 1665 ea., 11898-14Q, Mar. 3.
Fasteners, latch, 18,280 ea., 12055-23-Q, Mar. 3.

Ordnance Tank Automotive Center, Detroit

Kit, repair, frt axle steering knuckle flange, 75,000 ea., 52-1462B, Mar. 7.
Kit, repair, diff, 12,500 ea., 52-1462B, Mar. 7.
Kit, repair, universal joint, 30,000 ea., 52-1462B, Mar. 7.
Flange, companion frt axle steering knuckle rt assy, 6500 ea., 52-1462B, Mar. 7.
Kit, repair, drive shaft universal joint thrust ball, 12,000 ea., 52-1462B, Mar. 7.
Arm, rocker, fuel pump, 1000 ea., 52-1581B, Mar. 7.
Screw, fuel pump, 5000 ea., 52-1581B, Mar. 7.

Rocky Road for Controls Extension?

Congressmen see snags for Administration campaign for 2-year extension of controls . . . Concessions must be made . . . Hearings on Mar. 4 . . . Will power shortages stay? —*By G. H. Baker.*

Administration propaganda in support of a 2-year extension of federal controls over prices, profits, wages, and materials is off to a fast start, but present congressional sentiment indicates that many concessions must necessarily be made in the coming weeks.

Chairman Burnet Maybank, D., S. C., of the Senate Banking Committee, is urging his upper-chamber colleagues to submit all proposed amendments to the control law within the next week, so that they may be considered when his committee begins public hearings on Mar. 4.

Wait for Senate—Maybank hopes to conclude hearings by Apr. 1, and to begin writing a new law which will be acceptable to a majority of members before expiration date (June 30) of the present statute.

In the House, Rep. Brent Spence, D., Ky., chairman of the House Banking Committee, says he will not begin lower-chamber hearings until the Maybank group has concluded its investigation. Spence, usually a staunch supporter of Mr. Truman's programs, hints that he has little hope of enacting all that the White House asks. "I hope we can retain what we've got," he comments.

Wright Report—Wage Stabilization Board's release of the report made by one of its panels in the Wright aeronautical labor disputes is interpreted by some congressmen as a tip-off that the Administration is prepared to "give Phil Murray anything he wants."

Feeling is that Professor Harry Shulman (Yale University) may try to repeat in the current steel-wage negotiations the same benefit pattern he established in his report on the Wright dispute.

Mr. Truman, a number of congressmen believe, is trying to make the Capehart Amendment and other provisions of the Defense Production Act scapegoats for the Administration's failure to fight inflation with the tools already available.

Strong Warning—James G. Byron, vice-president and director of Curtiss-Wright industrial relations, wired Defense Mobilizer Charles E. Wilson that recommendations in other industries, similar to those made by Shulman for the Wright plants, could destroy the national economy. He told Wilson the proposed wage increase, plus a retroactive annual improvement factor, was an "abuse of authority and destructive of free collective bargaining."

In the Wright case, the Shulman panel recommended wage increases of about 15¢ per hr.

"England wants it back, Professor. Something about a scrap drive."

Power Capacity—Regional shortages of electric power will continue to plague industry for at least another 3 years, unless planning for new generating capacity is begun "at once," an industry-government committee predicts.

Edward W. Morehouse, vice-president, General Public Utilities Corp., New York, N. Y., rejects the view held by some government planners that the present expansion program in the power-generating industry will be sufficient to meet all needs by 1954. Morehouse was named by Defense Production Administration to head the industry-government committee.

Increasing defense needs make it imperative to step up the present program, the committee finds, if industrial production is not to suffer from enforced shut-downs.

Wishful Thinking—Federal officials charged with the task of deciding what to do in case of an enemy atom bomb attack now believe that it doesn't make any difference whether the operations of the Federal Government are decentralized or not.

As a matter of fact, the Budget Bureau now is telling Congress, Washington probably will be safer than most other cities.

"An enemy with a limited stock of unconventional weapons," according to the Budget Bureau, "would rather expend them on our Pittsburghs, our Bridgeports, and our Dallases, rather than expend them in trying to blot out the metropolitan area of Washington."

Dispersal—rather than decentralization—of government operations is the hub of the new plan. President Truman is asking $15 million to move federal agencies into Maryland and Virginia.

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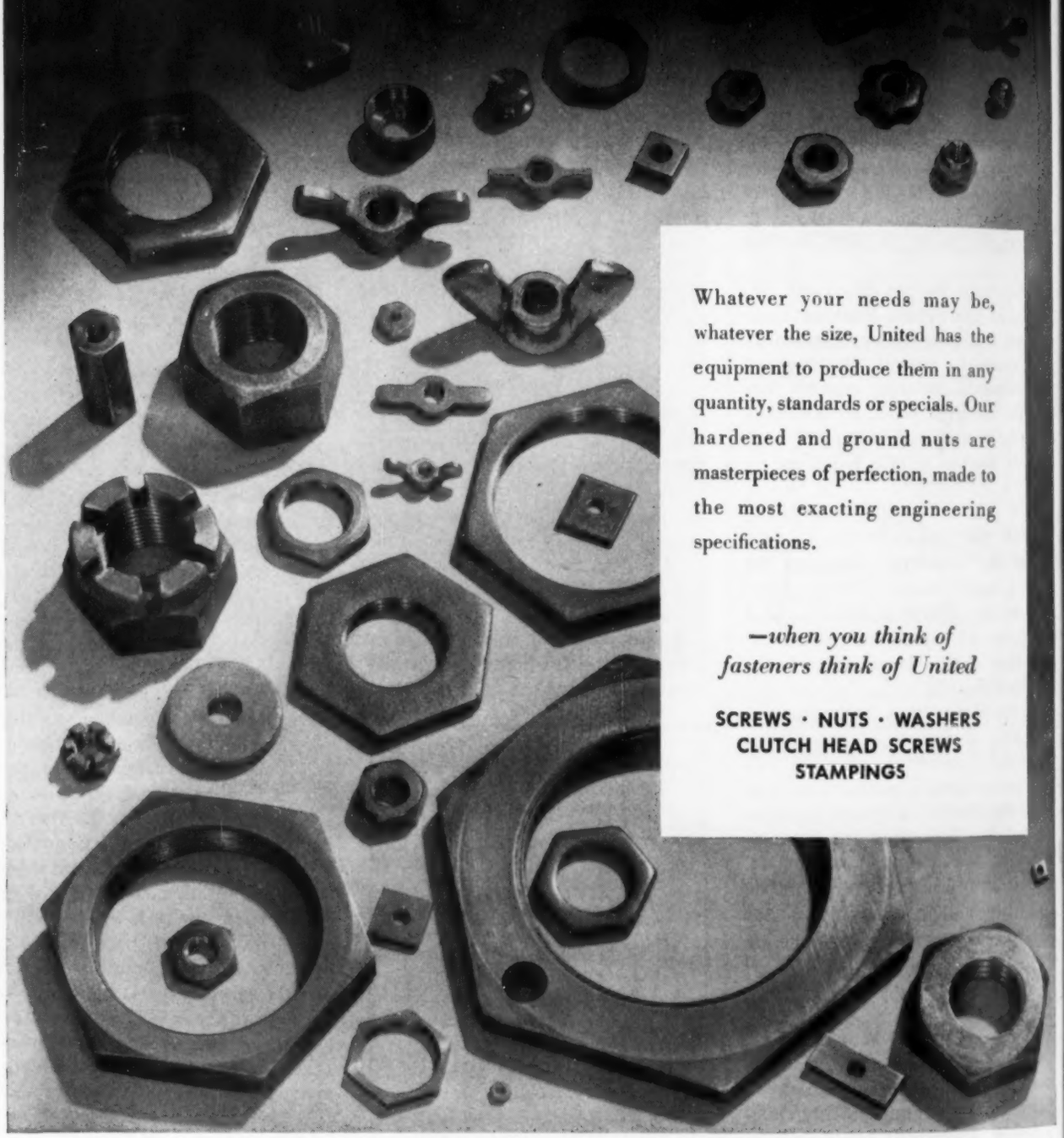

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WRITE-OFFS: Made Harder to Get

New DPA Reg. 1 tightens up on fast tax amortization permits . . . Agency will predetermine materials supply, project essentiality . . . OK not needed to buy non-real property.

It will be much tougher after Mar. 1 for industry to get certificates of necessity for fast tax write-offs.

This is the effective date for the revised rules just laid down by Defense Production Administration in DPA Reg. 1. It has been approved by the White House, and replaces the original regulations issued by National Security Resources Board.

Major change lies with the "predetermination" provision. This requires the applicant to obtain, before beginning construction, a predetermination by DPA as to the shortage of the facilities involved and the essentiality of the product.

Over $100,000 — Pre-determination applies to all construction and permanent installations estimated at more than $100,000 and not started before Mar. 1. After that date, start of construction without a certificate or at least a letter of predetermination will automatically bar such a certificate.

Predetermination does not apply to acquisitions except "where they become a permanent or an integral part of the realty." It would not apply to acquisition of the land itself, DPA explains, nor to most machine tools.

A rule of thumb would be that predetermination is required "for installation of facilities which will become real property."

Applications for certificates on equipment which is not intended to become a permanent part of real property can be filed any time within 6 months of the date of acquisition.

Need Main Guide — More than $13 billion worth of projects have been approved for the rapid tax write-off concessions. Because of the need for immediate industrial expansion, DPA has largely looked at the need without much regard to other provisions of policy ordered by the White House last fall.

Essentiality as well as the amount of materials needed will still be a major factor in predetermination. But other factors will play important parts also.

Among these DPA said, will be "compliance with government policies such as those relating to manpower and dispersal."

Other Considerations—Other factors include expansion in competitive fields, historical background of the industry, extra costs due to expedited construction and other emergency factors, and "the economic consequences of the location due to security or other emergency factors."

New Reg. 1 spells out the new rules as well as revisions and modifications originally issued by NSRB.

Revised application forms are now being prepared. DPA said these should be available at the agency or Commerce Dept. field offices by the effective date of the regulation.

DTA Rails Expert Urged for DPA

Railroad industry representatives made a strong pitch last week to have either the Defense Transport Administrator or some rail expert from DTA appointed to a seat on Defense Production Administration's requirements committee.

Moreover, it was urged, National Production Authority's railroad industry advisory committee should be consulted by DPA and DTA before final allotments of materials are decided upon for each of the quarters.

The reason for these recommendations is that the railroad men feel that the industry is getting the short end of materials allocations for production of transportation equipment. (THE IRON AGE, Feb. 7, 1952, p. 99.)

RAIL BOARD: Members of President Truman's emergency board after recommending a union shop for non-operating railroad employees. Left to right: Aaron Horvitz, New York; George Osborne, Stanford University, Calif.; and David Cole, Paterson, N. J., chairman.

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Industrial Briefs

Merger Approved—Stockholders of ELASTIC STOP NUT CORP. OF AMERICA, Union, N. J., voted approval of a merger between ESNA and American Gas Accumulator Co., Elizabeth, N. J. Under terms of the merger AGA will be operated as a division of ESNA, with its present management.

New Contract—F. H. McGRAW & CO., New York, has received a contract for the installation and rearrangement of equipment at the Hammond, Ind., plant, Standard Railway Equipment Mfg. Co. of Chicago.

New address—RAMSEYER & MILLER, INC., consulting engineers, have moved to new and enlarged offices at 11 W. 42nd St., New York.

Scrap Salvage—A contract has been awarded to SCHIAVONE-BONOMO CORP., Jersey City, to reclaim more than 1,500,000 lb of steel rail for scrap from a discontinued section of city subway line. The operation involves dismantling track totalling more than 10 miles in length.

Die Department—A new 12,000-sq ft addition has been completed at the Minneapolis plant, of the FEDERAL TOOL & MFG. CO. Most of this space will be devoted to an expanded die department.

Expands Offices—RICH STEEL CO., Los Angeles, has increased its warehousing facilities and general offices and has added several new units of processing equipment plus a pickling and phosphate coating plant capable of treating over 100 tons of steel per day.

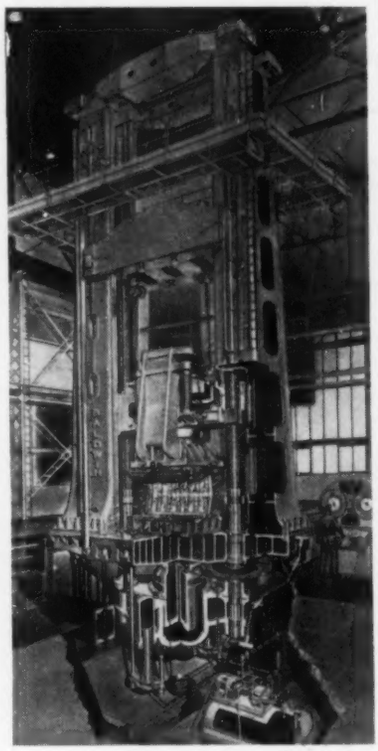
New Headquarters — The AUSTIN CO. has established new headquarters for its Special Devices Div. in the Port of New York Authority Bldg., New York City. The compact layout takes up more than twice the space formerly occupied by the division.

Larger Quarters—Construction of a new and larger plant has been completed by COLONIAL BUSHINGS, INC., at 31780 Groesbeck Highway, Fraser, Mich. It is expected that full production will be reached by the middle of March.

Lab Established — A 20,000-sq ft products development lab has been established by BORG-WARNER CORP., at Detroit, to do military development work as well as experimentation in producing lighter and simpler automatic transmissions and torque converters for automotive use. The lab will be equipped with a special fleet of trucks and cars for testing purposes.

Plant Completed—A new $1 million plant, containing 67,000 sq ft of floor space, has been completed by the E. F. HAUSERMAN CO., Cleveland. In addition to its present volume of rated orders, the company is negotiating with the armed forces on several defense projects.

Half-Century Mark—INLAND STEEL PRODUCTS CO., Milwaukee, commemorates its fiftieth year of service to the building trade this year. Tentative plans have been made for an official observance later in 1952.



TESTING: Model of the 2500-ton vertical universal testing machine to be installed at Lehigh University, Bethlehem, Pa. Machine will be a capacity hydraulic tension-compression machine.

Construction Planned — WALTER KIDDE & CO., INC., Belleville, N. J., has planned construction of a new engineering and development building to be completed within 8 months. The new building will facilitate the company's program for the development of new products and refinement of products already on the market.

Obtains Rights — Under a license agreement with the Al-Fin Div. of the Fairchild Steel Engine and Airplane Corp., ROLOY PISTON CO., PTY. LTD., Port Melbourne, Australia, has obtained exclusive rights for manufacture of bi-metallic pistons for automotive engines, using the patented Al-Fin process of molecularly bonding aluminum to steel.

In Business—FABRICATORS STEEL CORP., has completed its new plant and general offices at Bladensburgh, Md., to fabricate structural steel and reinforcing bars and to warehouse steel items. B. C. Thomsson, formerly manager of sales for Rosslyn Steel and Cement Co., Washington, is vice-president and general manager. Edward Stern, formerly assistant general manager for the Allied Metals Co., Niles, Ohio, is in charge of warehouse sales; and Harry S. Brown, Washington, is treasurer.

Ford Builds Plant—Foundation work will be started immediately by Anglin Norcross, Ltd., Toronto, on a new assembly plant near Oakville, for the FORD MOTOR CO. OF CANADA LTD. Estimated expenditure for the plant is approximately $17 million.

New Office Building—SCAIFE CO. is building a new two-story office building adjacent to its plant in Oakmont, Pa. Completion is scheduled for October, 1952. The building will cost more than $500,000. Scaife is observing the 150th anniversary of its founding this year.

Under Construction—SUNDBERG-FERARR, industrial designers, is constructing a new 4000-sq ft modern building at Royal Oak, Mich. The building, located at 1204 S. Woodward, Royal Oak, is expected to be completed in July.

"MUST" Reading for Plant Engineers

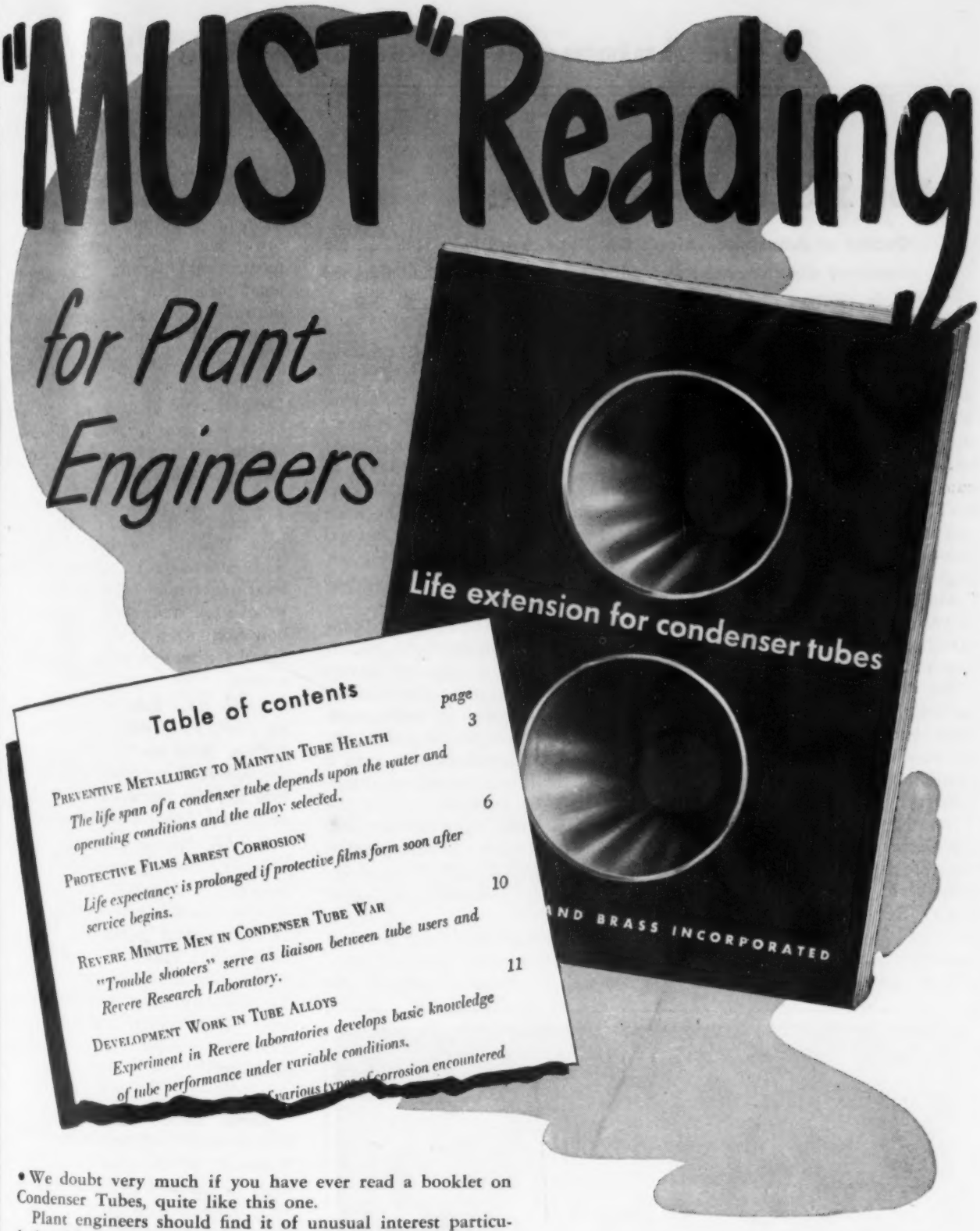

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Table of contents
page
PREVENTIVE METALLURGY TO MAINTAIN TUBE HEALTH
The life span of a condenser tube depends upon the water and operating conditions and the alloy selected. 3
PROTECTIVE FILMS ARREST CORROSION
Life expectancy is prolonged if protective films form soon after service begins. 6
REVERE MINUTE MEN IN CONDENSER TUBE WAR
"Trouble shooters" serve as liaison between tube users and Revere Research Laboratory. 10
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Detroit Sees UAW Policy Fight

Ouster of Johnstone, union's GM Dept. head stirs talk . . . No contract disagreement . . . Differences with Reuther thought main reason . . . Livingston succeeds him—*By W. G. Patton.*

Ouster of a top-level union director temporarily rocked United Automobile Workers-CIO-General Motors labor relations last week. A. T. Johnstone, director of the union's GM Dept., was removed because of "health and for certain policy differences." Johnstone's only comment was that the reasons given for his ouster were "poorly founded."

The firing of Johnstone is not interpreted as a reflection of union dissatisfaction with the 5-year GM contract. Johnstone headed the union delegation which negotiated the unprecedented GM wage agreement. Under his regime, GM workers have enjoyed a period of labor peace that is envied throughout the industry.

Disagreement — Union sources insist Johnstone's removal resulted from basic policy differences with Walter Reuther, UAW-CIO president, and as a result of objections made by certain GM locals.

Other possible contributing factors: (1) Johnstone's failure to take an active part in UAW political activities, (2) rivalry with Walter Reuther, (3) desire for a change in the GM Dept. by union officials.

Johnstone will be succeeded by John W. Livingston, UAW vice-president. Livingston has been active in the GM Dept. for several years and has been a leading negotiator for the union.

Springtime—The automobile industry is still hopeful that, with the return of spring, new car buyers will again make their way to automobile showrooms in large numbers. Car production is picking up. Last week's announcement that a million additional pounds of aluminum will be available during the second quarter increased the possibilities of a 930,000 unit quarter. Copper is still doubtful but is expected to be allocated in larger amounts.

Auto production during the first quarter has been at a rate of 850,000 units. Permitted output during the January-March production is 1,006,000 passenger cars. At the moment, the industry is building fewer cars than its materials allotment would permit. The employment picture in Detroit is slightly improved as car assemblies are being stepped up.

Detroit hasn't solved its unemployment problem—far from it. Even car production at a million units per quarter will still leave a substantial number of workers on compensation and relief rolls.

Parts Needed—One of the problems Washington has to wrestle with nowadays is balancing available materials between new car production and service parts. As new car output is cut back, the demand for service parts tends to increase.

There have been indications that an increased percentage of the materials, particularly steel, going to the automobile industry have gone into service parts. This is highly profitable for the auto industry.

Service parts probably represents the best opportunity the auto industry has today to boost its profits. Despite increased attention to replacement parts, the industry is none too hopeful it will be in a position to meet customer demand for service during the second quarter. There simply aren't enough available service parts, the trade believes.

Move Machines—Chrysler has begun machining operations at its Trenton, Mich., plant. Machines used in the flywheel and flywheel ring gear assembly were among the first transferred. A total of 508 machines will be moved from Highland Park to the Trenton plant in the next few weeks. Parts will be produced at Trenton while manufacturing is being continued at Highland Park. Eventually, the entire truck engine operation will be moved to Trenton.

Turn Page

NEW MODEL: This Nash Motors Div. 1952 Nash-Healey sportscar was styled by Pinin Farina, European designer.

DEFENSE: Call Plan Misunderstood

Frank Rising, Auto Parts Mfrs. Assn. manager, claims preparedness is misinterpreted . . . Planned to provide facilities, not huge flood of orders . . . Design changes are inevitable.

The defense program is one of the most misunderstood national projects in U. S. history, Frank Rising, general manager, told members of the Automotive Parts Mfrs. Assn. recently. In his "Memo to Management," Rising argued that, as now planned, defense work will *not* flow into industry in large enough quantities to plug up the unemployment holes.

"The defense program doesn't translate into mass production, or mass employment. It is to a considerable extent an engineering job —not a production job. It is a make-ready program or a 'get ready' program."

Rising points out that our defense program calls for facilities to make tanks—not the tanks themselves. Washington wants *facilities* for everything, he continued—but not the everything.

No Great Floods—The average man who thinks the defense period is just like World War II is bound to be disappointed, Rising argues. Why kid ourselves into expecting a great flood of war goods? Why lead the people to believe that if we could "just get the machine tools," these tools would go to work immediately to turn out war machines in vast numbers?

It isn't an accident that this is a period of much experimenting, frequent changes in design, small pilot jobs, frequent changes of mind. This is the way the military men want it, Rising believes. 'They don't want immense stores of obsolescent materiel—they want preparedness with a big P."

The military's wish not to be caught behind the times in war materiel has also confused production pictures of other industries—namely steel. Recently an industry task force committee, asked to report by Mobilizer Wilson, charged that the blueprint of military needs to guide steel expansion had not been made.

Slashing the automobile industry may be necessary, Rising concluded, but it isn't necessary to let people believe that the laid-off mass production workers will soon be mass-producing war goods.

Nash Introduces New Sports Car

Featuring a custom body built at Turin, Italy, a "trailing link" front end suspension built in England, and an engine and mechanical parts manufactured by Nash Motors in the United States, the Nash-Healey sports car was introduced last week at the Chicago Automobile Show. The hand-built model was styled by Pinin Farina, European designer.

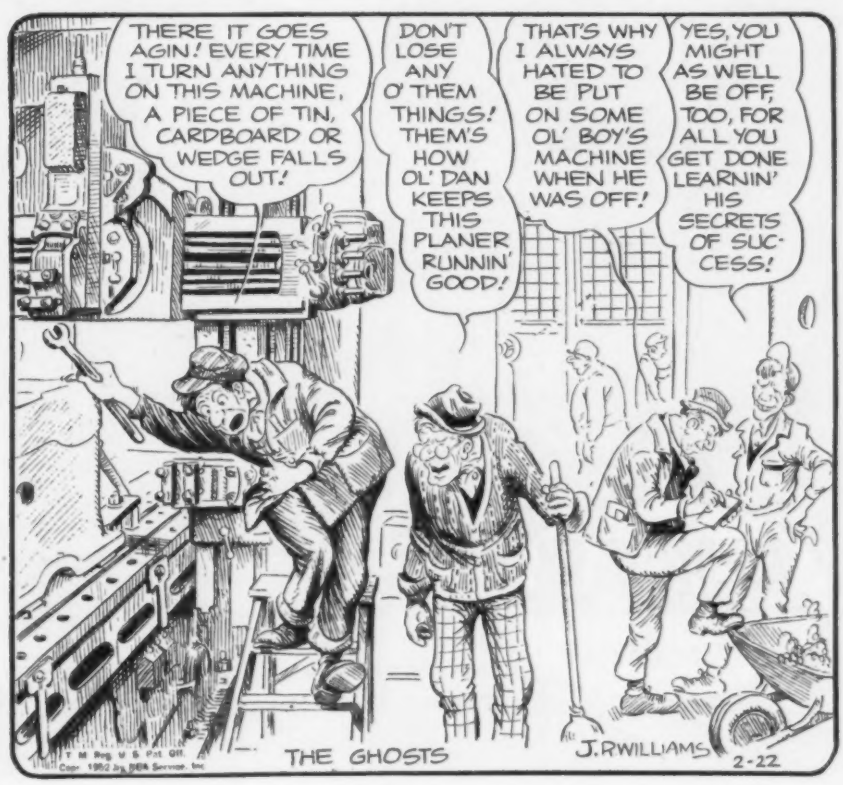
Departing noticeably from American styling, the front fenders rise well above the hood lines and continue through the door panels. The rear fenders have "fins" like many U. S. cars.

Eight to One—Powerplant of the Nash-Healey is a 125 hp Nash Ambassador equipped with an aluminum head. The engine has a compression ratio of 8 to 1. The engine is equipped with two British horizontal carburetors working in conjunction with a "Sealed-In Iso Thermal" intake manifold. A bearing crankshaft is used.

Each front wheel is mounted on a "swinging arm," pivoted ahead of the wheel centerline and cushioned against a coil spring. Coil spring suspension is also used at rear wheels.

Farina employs 650 craftsmen in his custom body plant in Turin, Italy. He turns out about 100 hand-built bodies per month. Many Farina-style cars are built on individual order.

THE BULL OF THE WOODS — **By J. R. Williams**


THERE IT GOES AGIN! EVERY TIME I TURN ANYTHING ON THIS MACHINE, A PIECE OF TIN, CARDBOARD OR WEDGE FALLS OUT!
DON'T LOSE ANY O' THEM THINGS! THEM'S HOW OL' DAN KEEPS THIS PLANER RUNNIN' GOOD!
THAT'S WHY I ALWAYS HATED TO BE PUT ON SOME OL' BOY'S MACHINE WHEN HE WAS OFF!
YES, YOU MIGHT AS WELL BE OFF, TOO, FOR ALL YOU GET DONE LEARNIN' HIS SECRETS OF SUCCESS!
THE GHOSTS
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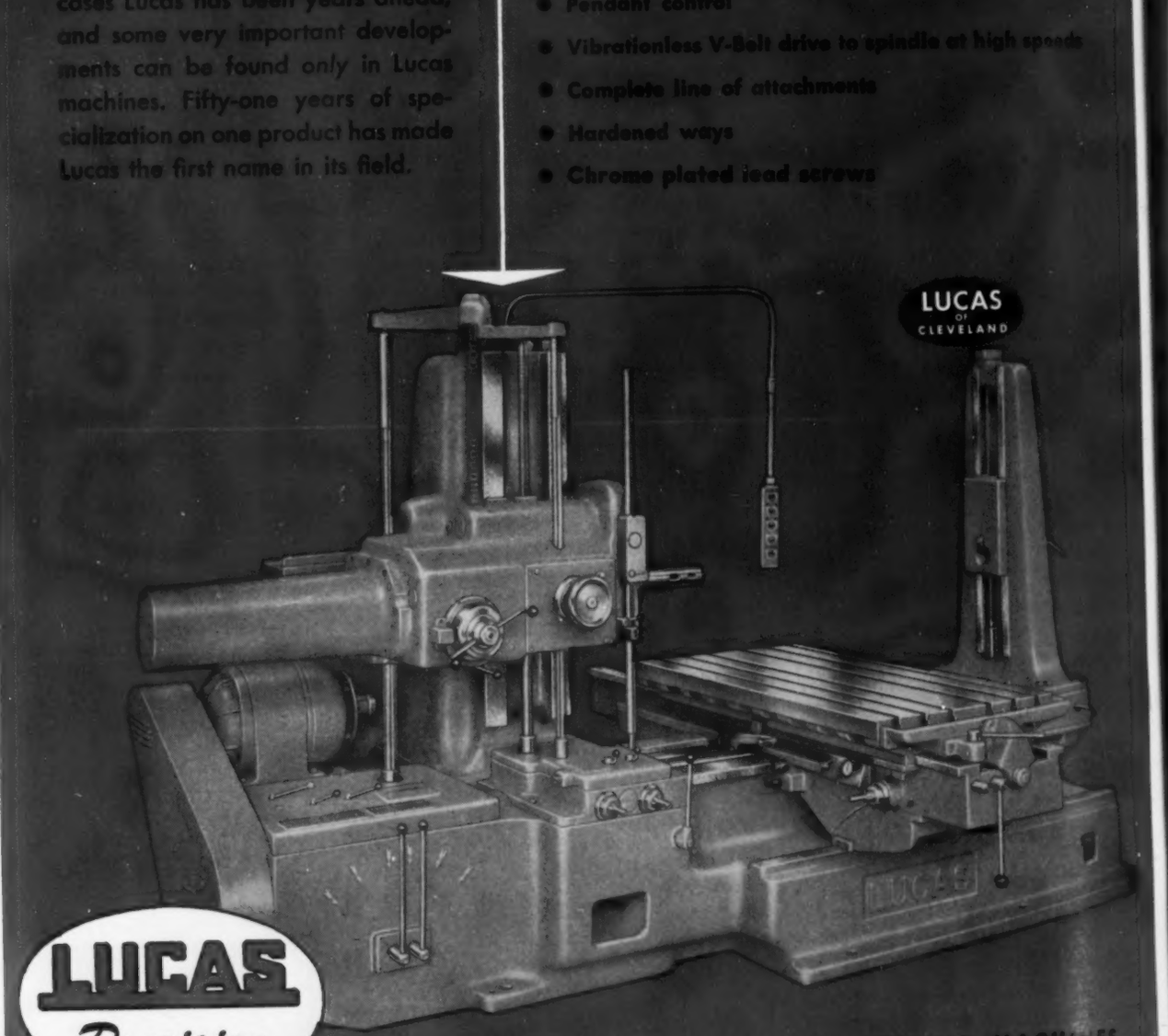

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Shipments Leap Again in January

NMTBA index of shipments will reach 264, up from December's 246 . . . New order index will climb to 420 from 417 . . . Subcontracting helps . . . Low blow from Bedford—*By G. Elwers.*

Machine tool shipments were up sharply again in January. The shipment index of the National Machine Tool Builders' Assn. will reach a figure of about 264, up from around 246 in December. The new order index will show a moderate increase from about 417 to 420.

January is thus the fourth straight month of substantial machine tool shipment increases. Since September, the shipment index has risen more than it did in the previous 8 months.

Subcontracting Helps — Much of the increase can be attributed to subcontracting. Subcontracting now accounts for more than 20 pct of machine tool production. This is a higher percentage than was reached at any time in World War II.

The industry's backlog, in terms of months of production at current production rates, has dropped from 24 in September to 19 in December. January will show a further decline.

Cancellation of orders has been increasing in the last 6 months and is currently a fair percentage of new orders. However, increasing production accounts for most of the decline, both in the plants of builders and of subcontractors.

Hard to Locate—The industry has had a hard time finding suitable subcontractors, but is plugging away steadily. The present figure is expected to rise to near the goal of 30 to 35 pct by the end of the year.

These figures answer the Detroit statement of a government official, who accused the industry of dragging its feet on subcontracting Typical of industry reaction to this statement was one builder's comment: "We've been trying for months to find subcontractors in Detroit, with no luck."

Below the Belt—The machine tool industry got another low blow recently from Clay Bedford, special assistant to Mobilization Boss C. E. Wilson.

Speaking in New York, Mr. Bedford referred to the Fisher Body subcontract for Bullards as "one of the smartest things the Dept. of Defense has done." Mr. Bedford said "Every effort has been made to induce the machine tool industry to meet our requirements, but it has been slow, aggravating work. By letting the contract . . . to a firm outside the industry, we served notice that we were going to get the machine tools we needed wherever and however we could . . . and right now.

"As a result, the machine tool people quickly found ways and means to produce . . . cheaper and quicker."

Industry in Clear—Mr. Bedford is apparently claiming that the Fisher Body contract pressured the machine tool industry into upping its production. This amazing idea comes from a man in a position to know better.

"These time-motion studies have caused some drastic changes in my habits."

Actually, the record shows the industry has made every effort to increase its production, and has been hampered by lack of understanding and cooperation in Washington.

This was recently reconfirmed in a 107-page report on machine tools made by the Joint Congressional Committee on Defense Production. This report completely absolved the industry from responsibility for the current machine tool bottleneck.

"What About Us?" — Machine tool distributors are concerned about the proposed plan to stockpile $3 or $4 billion of production equipment, mostly machine tools. They want to know where they come in.

As it stands today, most distributors get a full commission on tools they sell, and a partial commission on tools sold from the factory but installed in their territory. This last is because they are responsible for service on the tools even if they didn't sell them.

But what about tools sold for stockpiles? Eventually they'll be installed somewhere and become a dealer's responsibility. But does he get a commission on them?

Tribute to Stability—The machine tool industry is often publicized as one with extremely wide cyclical swings. So it is unusual to find firms in the industry being recommended by investment advisory services. It is a tribute to their stability and progressiveness.

These names pop up regularly in financial advice these days: Bullard, Niles-Bement-Pond, Monarch, Cincinnati Milling Machine, and American Steel Foundries. Also, Monarch and Cincinnati Milling appear on lists of stocks on which dividends have been paid each year for more than 25 years.

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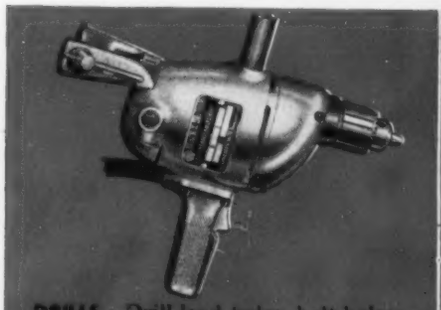
FASTER TOOLS

for Production, Maintenance, Construction

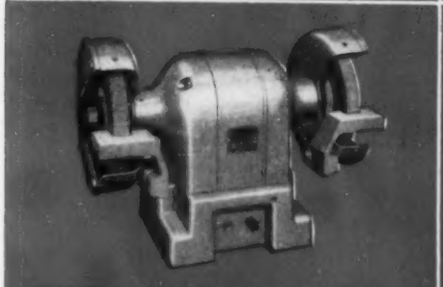
by Black & Decker



DRILLS—Drill lead holes, bolt holes; drill out broken fastenings; drive twist drills, wood augers, masonry bits, Hole Saws.

SCREW DRIVERS—Drive all types of fasteners in assembly of wood, metal or plastic parts. Do fast disassembly in repair work.

SANDERS—Drive abrasive discs, saucer grinding wheels, "Whirlwind" wire cup brushes for everything from finishing metal to removing rust.



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You Won't Get Much More Scrap

Reports of a softer western market fictional except for cast . . . Mills take all they can get, dealers stocks under limits . . . Dirty bales a problem . . . Cast is plentiful—*By R. T. Reinhardt.*

Last week rumors were floating around the West Coast that steelmaking scrap was loosening up to the point where shipments East might be ordered by National Production Authority. A quick check indicates that although scrap has been moving more freely in the past 3 weeks because of good weather and the auto wrecking program, steel producers' inventories are generally well below the legal limit. All mills with the exception of a modest-sized operator are buying all they can get. "Easing" of the steel scrap market is purely fictional and probably arose from the softening of the cast iron market.

Facts are engine blocks and breakable cast iron have backed up in dealers' yards; and rejection of contaminated bales is increasing. Both circumstances give a base for the fallacious rumor.

Cast Plentiful — There is no question about the temporary abundance of cast iron: up and down the Coast it is selling from $5 to $8 a ton below ceiling. There is no question about dirty bales. Tin cans and other contaminants were included by marginal dealers when anything which wouldn't blow away was "No. 1 Heavy." Now the situation has eased to where purchasing agents and Office of Price Stabilization men won't turn their backs on such deliveries, but only to that extent.

NPA's order of last week directing the flow of scrap tin cans collected in nine California and two Arizona counties to shredding plants will no doubt help clean up the dirty bale problem. The order was issued because too many cans were going to steel plants instead of to copper producers who need them in their precipitation process.

Expansion — Colorado Fuel & Iron Corp. is completing the $1 million expansion of wire mill facilities at its Minnequa Works, Pueblo, Colo.

"The immediate task of CF&I—to provide accelerated and flexible production to meet defense and normal requirements — demands modernization and expansion," says Rudolph Smith, works manager. "We're going to make this the best wire mill in America."

STEEL: Engine nacelles for Lockheed's P2V-5 are being made of stainless steel instead of the usual aluminum by Solar Aircraft Co. San Diego. Stainless is used for greater structural strength with less weight.

Chief improvement is the $100,000 renovation of the cleaning house. Tunnel ovens which needed 40 min to dry rods have been replaced by flash bakers which do the job in 3 min. Reclaimed space will be used for storage of clean rods.

New Machines—Four new high carbon wire drawing machines are to be installed. Six Morgan "B" machines are being improved by addition of mono-blocks, increasing capacity 50 pct.

Capacity of annealing furnaces is being doubled. Two new bases and one furnace are already in operation. Eight more bases and three additional furnaces are yet to come.

Other new equipment includes 32 new nail machines and a new ornamental fence machine. These are already in place.

Pueblo broke a 35-year record in 1951 by drawing 161,000 tons of wire. Earlier record was 151,506 tons in 1916.

Alloy Help—Plans to establish a $500,000 tungsten treatment plant in Salt Lake City are under discussion between Vitro Mfg. Co. and the Defense Materials Procurement Agency. If built, the facility will "upgrade" tungsten concentrates. Part of the concentrates would come from a tungsten treatment well being built at Ely, Nev.

More tungsten may be produced south of Butte, Mont., by Alloys Metals Co. which has a government contract to develop a promising deposit.

More Light Wire—Indications are that California will soon have an aluminum wire and cable mill. An established company in the nonferrous field has been making inquiries about that type of production equipment. The project is still under wraps, but those who should know believe it will mature.

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Look in your own backyard!

Vital scrap lies in the oddest places . . . a morning's search can be a needed help.

Scrap is where you find it. Maybe not within the view of your boudoir window. But have you made a real check of your plant premises?

Frankly, all of us suffer from the same inertia and bad habits. We saw the papers and read of the constant cry for steel. We even read ads like these —made an instant promise to do something about it—and with our collective red face—forgot it.

But how about changing all that? How about this very morning—today at the very latest—joining us in a thorough search of the premises . . . and digging out that crumbling pile of iron oxide . . . the stuff you know you never will use in a thousand years . . . and get it on the way to the melting mills.

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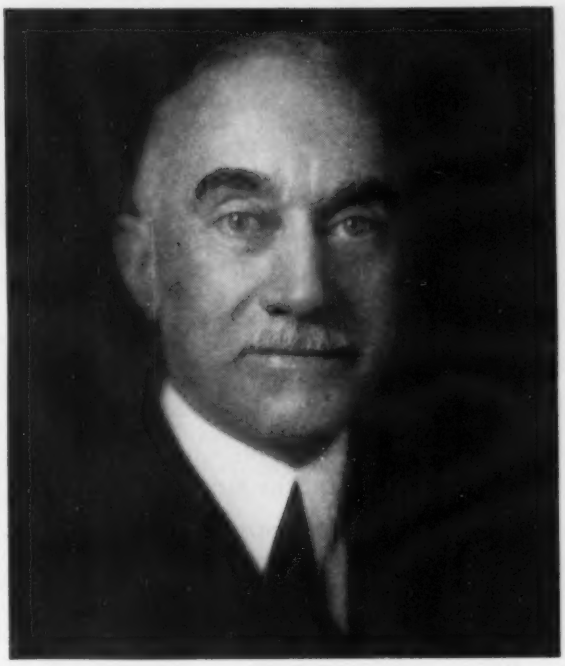
The Iron Age

SALUTES



Guilliam H. Clamer

He hasn't had time to retire . . . He's been too busy guiding development of electric furnaces.

THOUGH he'll be 77 next June, "G.H." Clamer continues to be the busy president of Ajax Electro Metallurgical Corp. and four associated Ajax furnace companies. He just hasn't had time to retire.

Perhaps without realizing it Dr. Clamer has helped prove that men over 50 are not through. He has often been honored for his lifelong contributions to metallurgy. In addition, his keen appraisal, selection and guidance of men have speeded development of several radically new types of electric furnaces.

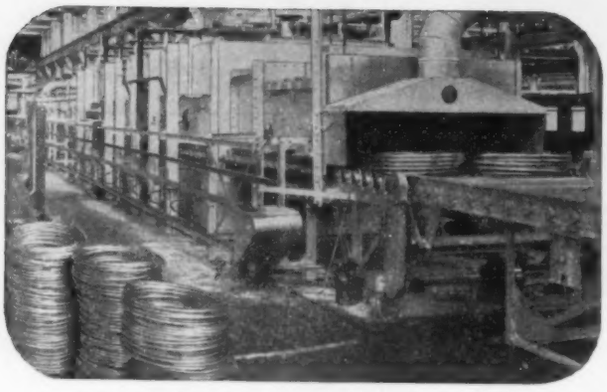
"G.H." has a way of stimulating those who work with him. Why? Partly because, once he is convinced of a man's capabilities, he backs him to the hilt. And there is always the example of his own work.

In 1910 a new type of furnace was required and he set out to build it. By 1916 the "Wyatt" low frequency or submerged resistor induction furnace, which resulted, was such a success he formed a new company to exploit it. He says he has long since forgotten what problem started it.

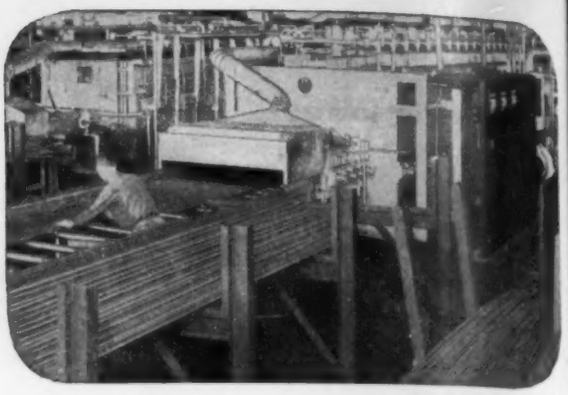
His foresight and patient guidance next helped inaugurate the high frequency induction furnace, with all its ramifications and importance, in 1916-18. Other furnace adaptations followed under his supervision.

Following each development of new or adapted furnaces, a new company was formed—with a new vice-president. The list has grown; "G.H." has seen to that.

Among his other interests are saddle horses, riding, golf, and power boating. But friends who know him best say his big urge in life is still metallurgy.



Straight lengths of brass and copper tubing are also bright and scale-free annealed in this EF gas fired furnace. Capacity 4000 lbs. per hour.



EF gas fired forced convection continuous roller hearth special atmosphere furnace bright annealing long straight lengths of tubing.

ANNEALING TUBING BRIGHT *and* CLEAN *Continuously*

• We have built many outstanding production furnaces for processing copper, brass, stainless, aluminum, nickel silver and other ferrous and non-ferrous tubing . . . in large and small coils . . . straight lengths, long and short, and in various diameters . . . also for many other products and processes.

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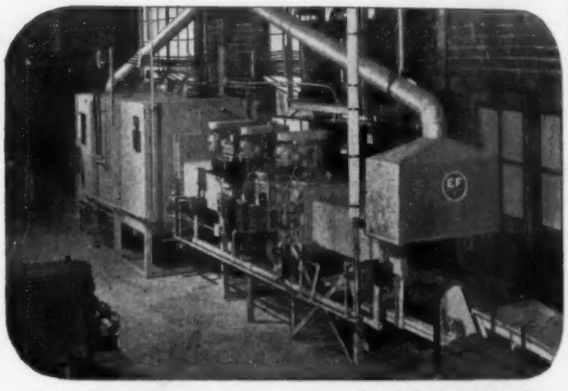
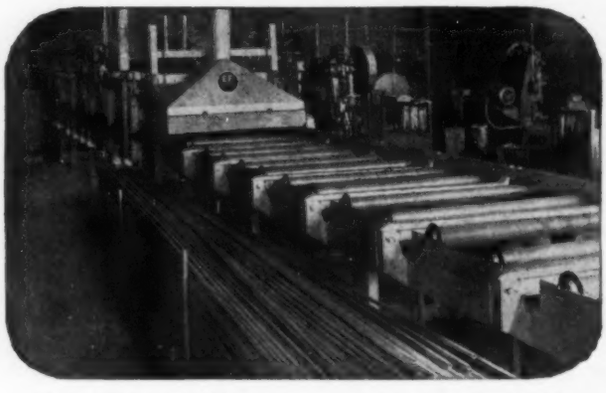


A special atmosphere belt conveyor electric furnace annealing short lengths of alloy tubing—operates at temperatures up to 2040° F.



3000 lbs. of steel tubing, per hour, are bright normalized in this EF gas fired radiant tube type special atmosphere furnace.

Straight lengths of tubing up to 5" in diameter and ¾" thick are also annealed in this EF forced circulation roller hearth furnace.

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The Iron Age

INTRODUCES

Louis F. Weyand, promoted to executive vice-president, MINNESOTA MINING & MANUFACTURING CO., St. Paul; and S. L. Johnson, appointed manager, New Methods Development Div.

Clifford W. Hoye, formerly vice-president in charge of production, elected president to succeed the late John Rycenga; and Ervin J. Wilee, formerly secretary and treasurer elected executive vice-president and treasurer, RYCENGA MANUFACTURING CO., Detroit.

Reed M. Andress, executive vice-president, promoted to the position of president and general manager, BARNES DRILL CO., Rockford, Ill. W. M. Fairbairn succeeds A. M. Johnson, as chairman of the board.

C. W. Thompson, appointed vice-president and treasurer, and R. E. Price, named assistant general manager, GARDNER MACHINE CO., Beloit, Wis.

Dr. Fred Olsen, appointed vice-president research and development, OLIN INDUSTRIES, INC., East Alton, Ill.

Stephen A. Keller, named general manager, Valve Div., MINNEAPOLIS-HONEYWELL REGULATOR CO., Philadelphia. He succeeds James H. Binger, who will continue as vice-president of the division.

Alexander S. Keller has joined the LAMB ELECTRIC CO., Kent, Ohio, as a director and vice-president in charge of finance.

James A. Nelson, appointed manufacturing assistant to the vice-president and general manager, General Products Div., AMERICAN MACHINE & FOUNDRY CO., New York.

Tom Turner, formerly vice-president in charge of industrial relations, becomes vice-president, motor and control division at Buffalo; T. I. Phillips, succeeds Mr. Turner as staff vice-president in charge of manufacturing; Robert D. Blasier appointed vice-president in charge of industrial relations; and John E. Payne, appointed vice-president in charge of the central sales district, with headquarters in Pittsburgh, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

William L. Rodich, promoted to general manager, laminated and insulating products department, chemical division, GENERAL ELECTRIC CO., Pittsfield, Mass.

A. C. Paulson, appointed manager, St. Paul Branch, CRUCIBLE STEEL CO. OF AMERICA, New York.

H. Stanley Bimpson, appointed chief engineer, steam turbine section, ALLIS - CHALMERS MANUFACTURING CO., Milwaukee. Charles D. Wilson, appointed engineer-in-charge of steam turbine design.

Paul H. Wolfe, formerly assistant district sales manager, appointed district manager, Atlanta District Sales office, REVERE COPPER & BRASS, INC., Baltimore.

G. J. Zimmerman, becomes general sales manager, all divisions; W. O. Buchanan, appointed sales manager, warehouse steel and brass sales; and J. Van Horne, becomes sales manager, Gensco Tool Div., GENERAL STEEL WAREHOUSE CO., Chicago.

Ed Swiatek, appointed sales manager, DIAMOND MACHINE TOOL CO., Los Angeles.

STEVEN P. J. WOOD, vice-president, elected executive vice-president, Warner Electric Brake & Clutch Co., South Beloit, Ill.

ALTON J. HOLE, appointed general manager, Metal Stamping Div., Ford Motor Co., Dearborn.

GUSTAV R. RICH, president of the new firm, Rich & Proctor Steel Co., Oakland, Calif.

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Personnel

Continued

E. D. Tuil, named to the newly created position of vice-president for personnel and plant, CUMMINS ENGINE CO., INC., Columbus, Ind.

J. C. Turner, formerly director of purchases, appointed assistant treasurer, SUPERIOR TUBE CO., Norristown Pa. **C. F. McKenna, Jr.**, promoted from works accountant to director of purchases, and **Kenneth L. Scheid**, promoted to chief cost accountant.

Howard D. Turner, appointed superintendent, Lukenweld Div., LUKENS STEEL CO., Coatesville, Pa., to succeed **E. Raymond McClung**, who has retired.

Walter Carlsen, assistant manager of sales, promoted to general manager of sales, BENJAMIN WOLFF & CO., Milwaukee.

A. B. Hennessy, Jr., appointed district manager of sales, Chicago area, SUMMERILL TUBING CO., division of Columbia Steel & Shafting Co., Pittsburgh.

Orville B. Tearney, appointed manager of credits and corporate insurance, INLAND STEEL CO., Chicago. **Sherman Hoyt**, succeeds Mr. Tearney as assistant manager.

Donald H. Rishor, appointed to the sales staff, FREDERICK B. STEVENS, INC., Buffalo.

Herman Muller, previously general foreman, named assistant superintendent in charge of night operations, TEXAS ENGINEERING & MANUFACTURING CO., INC., Dallas.

Irving B. Remsen, Jr., has joined the headquarters engineering staff, HALL LABORATORIES, INC., Pittsburgh, as technical consultant on waste water problems in the industrial, municipal and utilities field.

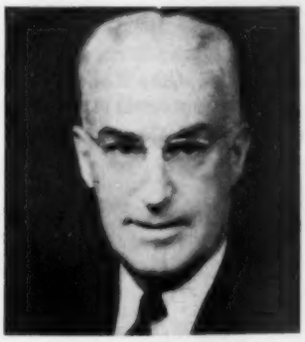
Andrew B. Stevens, promoted to assistant factory manager, AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind.

George A. Fyrberg, appointed production manager, Abrasive Div., NORTON CO., Worcester. He succeeds **Harold C. Dunbar**, who has retired.

Harry B. Hazelton, Jr., appointed general sales manager, IMPERIAL KNIFE ASSOCIATED COMPANIES, INC., New York.

W. J. REILLY, appointed general production manager, Steel Div., Ford Motor Co., Detroit.

THOMAS SPROULE, named manager of manufacturing, Welding Dept., General Electric Co., Schenectady.



W. R. YORKEY, appointed sales manager, Electric Controller & Mfg. Co., Cleveland.

WESLEY H. HOFFMAN, promoted to general sales manager, Harrington & King Perforating Co., Chicago.

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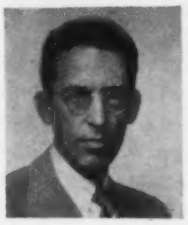
FOUNDED 1855
Technical Articles

Investment casting quality tied to GATING, MOLD TURBULENCE



By Rawson L. Wood
President
Arwood Precision Casting Co.
Brooklyn, N. Y.
and

Davidlee Von Ludwig
Consultant
Brooklyn, N. Y.

Flask temperature does not affect hardenability or tensile strength of 4140 and other ferrous alloys studied at Arwood Precision Casting Co. Gating designed for minimum turbulence in mold cavity produces cleanest castings, least scrap.

Uniformity of dimensions and rigid physical property specifications require very exact foundry technology for investment casting production. Analysis factors affecting commercial alloys used in investment casting have been undertaken at Arwood Precision Casting Co., Brooklyn, N. Y. Purpose is to determine physical property curves for commonly used ferrous and nonferrous alloys as secured by normal investment foundry processing.

Variables being investigated are:

1) Pouring temperature and its effect on grain size, ductility.

2) Investment and flask temperature effects on grain size and physical properties.

3) Effect of turbulence as controlled by gating technique.

4) Effects of standard heat treatment techniques in developing desired physical properties.

5) Effects of environmental variations on final physical properties of various commercial alloys as investment cast.

Other properties studied, but not reported here were:

6) Effect of bakeout and burnout techniques on the physical properties of metals cast into partially and totally burned out molds.

7) Effects of permissible deviations in alloy chemistry within the breadth of normal specifications.

First studies were made on outstanding common alloys representing basic steel families. Included were: stainless 410, a martensitic, heat-treatable high-chromium steel; SAE 4140, a low-alloy, medium-carbon structural steel, and 52100, a high-carbon, low-alloy tool steel. Studies of other alloys, such as 4130, 303, and 304 stainless and 440C martensitic stainless while not complete, tend to support conclusions reported here.

Over 20 partial and complete heats of these

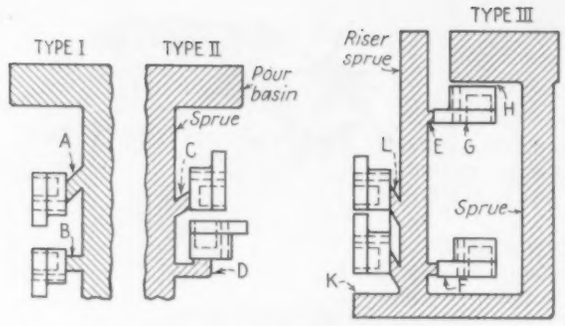


FIG. 1—Typical gating setups modified to permit quiet bottom filling and minimum mold turbulence aid in producing satisfactory investment castings. Designs which require multiple gating place a premium on use of insensitive alloys.

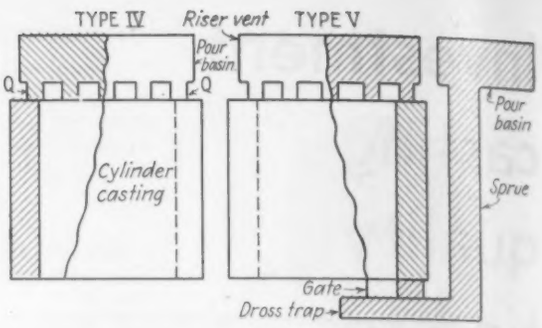


FIG. 2—Small, numerous gates used for larger castings (Type IV) restrain larger dirt and dross but do not minimize formation of oxides, nitrides and other drosses as does the arrangement shown in drawing (Type V). Cylinder form was used for illustration only.

Investment casting (continued)

three alloys were made using electric induction melting crucibles and poured into lots of about 48 test coupons per heat for a total of over 2000 test specimens. The 150 lb melts permitted close control of alloy additions. Specimens mechanically unsound, due to inclusions, cracks or other defects were eliminated from the results.

In small sections the castability of alloys is different. Alloy selection has been based on factors such as surface smoothness, apparent fluidity as indicated by reproduction of fine details and other factors relating to the rate of production. Such recommendations usually failed to define the causes for variable deficiencies, and have been useful only as approximate guides.

Where surface smoothness has been emphasized unduly, recommendations have been made repeatedly against martensitic stainless alloys such as types 410 and 416. In the investment cast form there is no real difference between these two grades. Of all alloys tested, 410 stainless is most uniform in response to investment casting and subsequent heat treatment.

The high chromium steels, martensitic and austenitic, because of inherent chemical stability, result in decreased formation of oxides or an increase in their solubility.

It has been standard for the investment industry to recommend stainless type 302 or 304 for replacement of nearly all ferrous alloys where high hardness is nonessential. The studies indicate 410 stainless should be applied where moderate hardenability and uniform impact resistance are required.

Grain size in ferrous and nonferrous castings has been arbitrarily presumed to be a weak factor in investment castings. While alloys which tend to have coarse grain as otherwise cast, do have relatively coarse structure in investment cast form, the present study has shown that coarsening of grain and basic physical properties are not materially affected by flask temperature.

No noticeable effect on hardenability or tensile strength of 4140 can be traced to flask temperature prior to pouring.

The increase in hardness when 4140 is drawn at 1450°F and air cooled is due to rehardening. Furnace cooling to 1400°F from a drawing temperature of 1525°F lowered the hardness again. Resulting tensile properties were substantially higher than obtained by direct tempering at 1400°F from the as quenched in oil from 1550°F condition, the basic treatment for all 4140 and 4130 test bars. Specimens for the above data were cast from four separate heats of 150 lb each. Over 200 bars were made and broken for

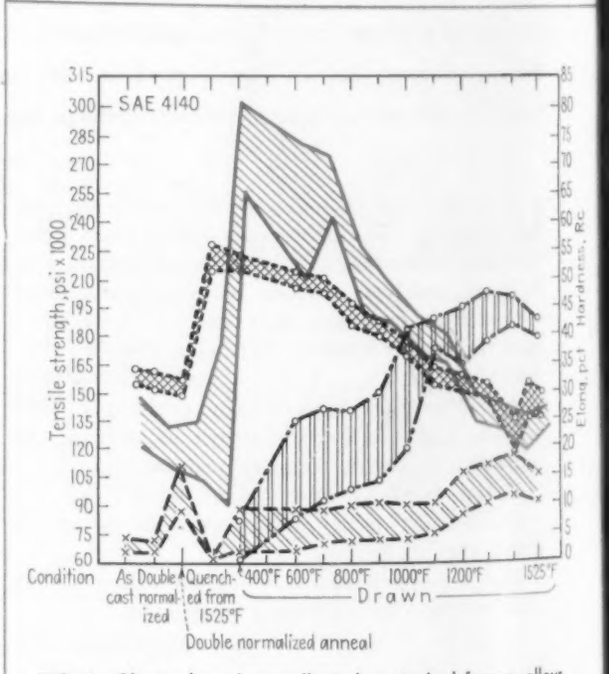


FIG. 3—Charts show data collected on typical ferrous alloys used in investment casting. Maximum potential for any level of hardness relates to SAE 4140 with type 410 stainless steel a close second.

this specific test in 4140 alloy alone.

Irrespective of inherent fineness, mechanical and physical properties are largely governed by the type and distribution of nonmetallic inclusions. Although type 410 stainless is inherently coarse grained, 52100 fine grained and 4140 moderately fine grained, type 410 is most reliable due to substantial insensitiveness to turbulence and resulting freedom from mechanical defects.

As cast grain size of 4130, 4140, and 52100 was affected by turbulence. A higher proportion of bars, as cast, broke with shear, coarse grain fractures with almost no measureable elongation. After quenching and drawing, however, fracture characteristics, apparent grain size and metallographic structures were all substantially identical.

Embrittlement induced by any moderate intensification of grain growth arising from the influence of mold temperature was so minor as to be of no real significance in considering use of an alloy for investment casting. Of the metals tested, type 410 was most apparently affected in this respect.

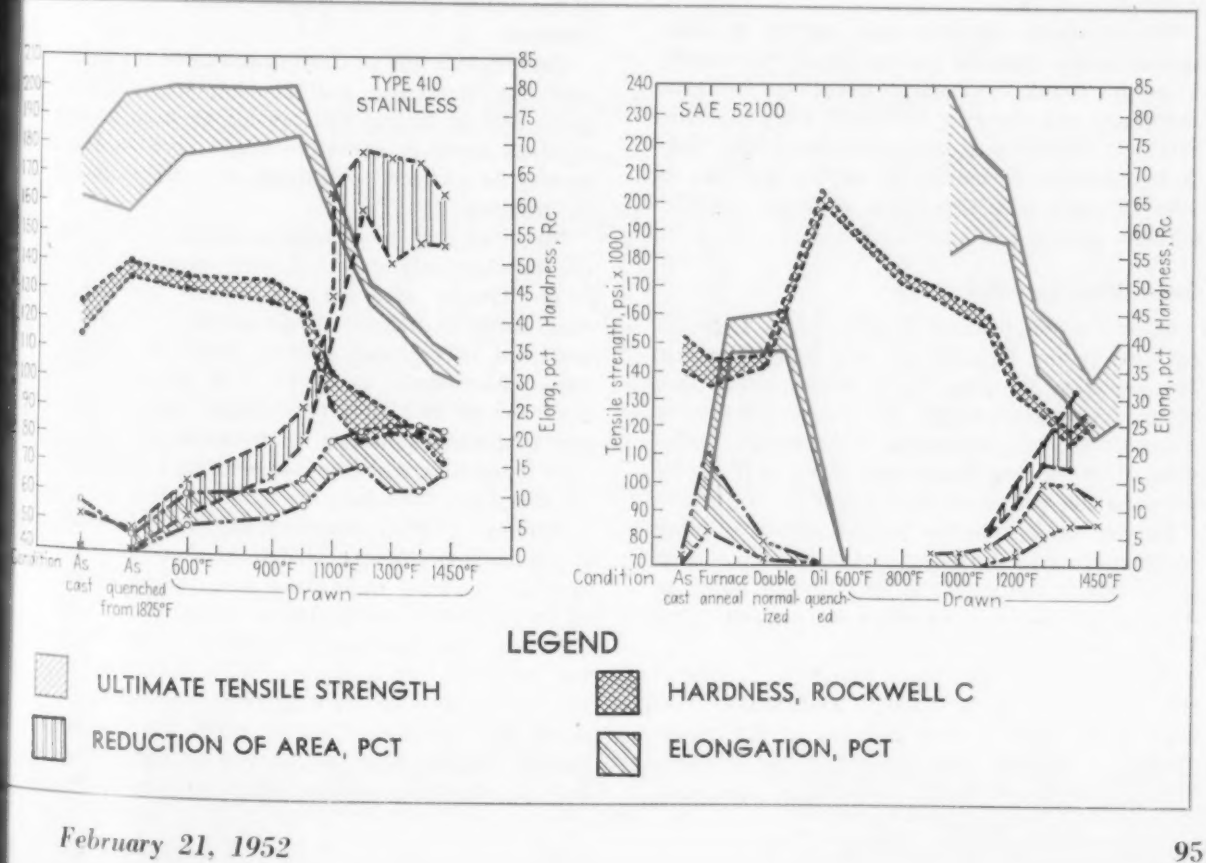
Specimens of 410 cast in room temperature flasks, when contrasted with specimens poured in flasks pre-heated to 1400° to 1800°F, were visibly finer and less brittle when broken in the as cast condition. This difference was totally obliterated by proper heat treatment. When test samples were oil quenched from 1825° to 1850°F, then drawn at temperatures from 600° to 1400°F, no difference in properties traceable to mold temperature remained.

As 410 is never used in the as cast condition (stainless properties are developed only in the heat treated condition), variation in as cast properties is inconsequential. As cast hardness was not affected by mold temperature in any hardenable alloy. Further, heat treatable alloys have a semi-quenched structure which in some instances approaches maximum hardenability of the alloy.

It is generally believed that "slow" cooling of the metal in an investment flask would cause very coarse grain, and tend to produce fully annealed castings. This belief is based upon a misconception of the relative heat transfer and suppression of cooling through the critical range of the metal.

Semi-quenched parts of fine grain size result from the wide difference between flask temperature (1800°F) and metal (above 3000°F). Also, grain size in an investment casting weighing a pound or less, is radically finer than in most sand cast masses. The influence of solidification quenching in investment molds was evident in studies made on ingots of 3120 steel. Surface hardnesses of 35 to 40 Rc often prevented bandsaw sectioning of ingots until annealed. With 0.20 pct C the alloy was not normally considered hardenable except by carburizing or similar additive processing.

Tests of type 410 stainless emphasized the importance of proper gating and venting in production of reliable structural parts of alloys such as 4130 or 4140. Irrespective of type of



gating, more than 90 pct of the 410 specimens were mechanically sound. In cases of maximum turbulence induced by poor gate design test specimens of 4140 would often be 90 pct defective.

It was demonstrated 4140 could be made equally as reliable as 410 stainless, by using single point gating and inducing flow away from the gate through adequate end vents. Several heats of 4130 and 4140 had yields in excess of 90 pct sound bars for tests.

Gating setups typified by Type I, Fig. 1, are most common for production of small castings in a single flask. Direct admission of metal by the shortest path, intended to assure maximum fill of fine details, is metallurgically unsound for sensitive alloys. Suited to stable metals such as 410 stainless or 18-8 stainless, it is not suited for clean castings of 4140, 52100, etc. Gate A or B may easily be changed by inversion as shown in gating Type II at C and D.

Small gates do not prevent oxides

Gate E in setup Type III is held to minimum length consistent with easy cutoff and may be used if the projection shown at F is adequate to fill the balance of the casting. If not, gating should be as shown in C, D or L. Location of the top casting in a setup, as shown by G must permit adequate clearance at H. Hydrostatic head must be sufficient to insure complete fill.

Type III gating yields the highest cleanliness in castings, but is costly. K is a projection on the runner to trap dross or dirt on the entering metal stream face.

Where single castings are set up in individual flasks, Type IV gating, Fig. 2, frequently is used. Small, numerous gates Q minimize shrinkage and are easy to cutoff. They restrain entrance of larger dross or dirt particles. They do not prevent formation of oxides, nitrides or other drosses resulting from splatter and turbulence within the mold cavity.

Oxide films harmful

Quiet bottom feeding possible with Type III gating may also be obtained with Type V gating. The separate pouring basin, down sprue and bottom contoured single gate arrangement is more costly, but minimizes nonmetallic inclusions. The pouring basin-gate setup of Type IV becomes the vent-riser in Type V.

Fundamental rule for gating sensitive alloy parts subject to the effects of turbulence must be to admit the metal at the lowest point in the casting cavity, with minimum velocity, and from a single gate.

No real merit has been found in trying to correlate X-ray inspection as a means of controlling the flow pattern because of the impossibility of seeing grain boundary oxide films. The thickness of most oxide films was such that regardless of orientation with respect to the X-ray beam they were invisible in the radiographic negative. These oxide films have proved to be most detrimental to the physical properties of the castings.

Metallic oxides formed in pouring 410 stainless are found either on the surface of the solidified metal in the form of surface pits or appear as soluble internal inclusions.

While about 20 pct of all 410 bars tested in the as-cast condition broke prematurely due to the presence of visible defects, less than 5 pct similarly were affected after solution or quenching treatment. This tendency was found on test specimens from five separate melts. It seems reasonable that some modification of the form of retention of non-metallics characterizes martensitic stainless such as 410. This does not apply to either 4130-4140 or 52100-5280 types.

The trade has long emphasized the need for designing parts to permit use of one large gate for admitting of metal to the cavity. Tests confirm the need for this design practice. Moreover, care is needed in selecting an alloy for a "difficult" design. Where dynamic loadings will be encountered all design factors relating to turbulence should be considered.

Oxides form on face of metal

Oxides which form on the liquid face of low alloy steels such as 4140 or 52100—tend to be trapped within the solidified structure. They constitute plans or points of weakness. Where the same melting and pouring practice was employed, using the standard 3-point test bar gating, most inductive of turbulence, 90 pct of low alloy steel specimens failed due to inclusions.

Correct location of casting cavity in the flask, and use of gating and venting which allow quiet bottom filling will permit as high yields of clean parts in sensitive alloys such as 4140 as may be secured as in insensitive alloys gated at random.

Properties of heat treated clean 4140 steel are substantially superior, with respect to maximum tensile strength. to other investment cast alloys tested. It is one of the most shock resistant investment casting structural alloys when adequately designed and gated. SAE 4140 and all low alloy or straight carbon steels are somewhat sensitive to formation of insoluble inclusions when so poured that turbulence is excessive. Test data are shown in Fig. 3.

Studies of 52100 vanadium modified tool steel reemphasized the importance of freedom from minute insolube inclusions and the influence of inclusions on all dynamic properties. SAE 52100 in the investment foundry is specified not only for tool and other high hardness applications, but also for moderately loaded structural applications. Use of 52100 for impact loaded designs however should be eliminated. It is among the most fluid of all ferrous alloys.

British study corrosion of steel, iron pipe

Increased recognition of the part cathodic protection plays in preventing corrosion of buried metals and definitive results of corrosion tests on steel and cast iron pipe have come from a series of British research projects on corrosion.

Results of the program, sponsored jointly by the Iron & Steel Institute in conjunction with the British Iron & Steel Research Assn. and the Society of Chemical Industry, were presented at a recent symposium in London presided over by Sir Charles Goodeve.

Corrosion was attributed to several causes. Changes in the concentration of soluble salts along the length of a pipeline in some cases caused areas of higher concentration to be anodic. Stray direct currents resulted in a variation in the potential of a buried pipeline relative to the soil causing an electrolytic cell effect.

Contact between two dissimilar metals resulted in a galvanic cell effect. In cases of bacterial corrosion, sulfate reducing bacteria accelerate corrosion by removing hydrogen on polarization.

Cathodic protection has proved successful in preventing corrosion. If sufficient electrical current flows uniformly into the metal surface from the surrounding ground electrolyte corrosion does not take place.

The current may flow from a higher potential scrap metal ground-bed anode supplied with an external direct current, or from expendable metal anodes such as magnesium, aluminum or zinc, having higher electrode potential than steel.

Current of from 1 to 15 amp per sq ft was necessary to ensure protection. The potential between metal and electrolyte varied from —0.35 to —0.70 v. Full protection was provided if more than —0.85 v was maintained.

Soils of less than 500 ohms resistance were found very corrosive while those of 2500 ohms were only mildly corrosive.

Studies of corrosion of cast iron and steel pipe indicated that differences in the soil were more important than differences in pipe material.

Three sets of bare and coated steel and cast iron pipe were buried in four typical British soils in 1944, and a fifth set in made-up ground. Soils included salt marsh, London clay, moist neutral clay, Keuper marl and cinders. The first set was examined after 5 years' burial. Results of the study are given in Table I and II.

For bare pipes differences in the aggressiveness of the soil were more important than differences in the material of the pipes. Differences previously reported in the resistance to corrosion of spun and vertically-cast iron pipes were believed due mainly to differences in wall thickness. A zinc coating of 2 oz per ft protected specimens over the 5 years except in a made-up ground of ashes where corrosion was heavy. A ¼-in. thick bitumen coating on steel tube was almost perfect at this site. A thin hot-dipped coal-tar-pitch coating, 5 mils thick, on cast iron pipe had failed.

TABLE I

CORROSION RESULTS, STEEL AND CAST IRON PIPE

Material	Salt Marsh		Keuper Marl		London Clay		Moist Neutral Clay		Ashes	
	Weight Loss, oz/sq ft	Equivalent Penetration, mils	Weight Loss, oz/sq ft	Equivalent Penetration, mils	Weight Loss, oz/sq ft	Equivalent Penetration, mils	Weight Loss, oz/sq ft	Equivalent Penetration, mils	Weight Loss, oz/sq ft	Equivalent Penetration, mils
Vertically-cast pipes	2.1	3.3	2.2	3.5	5.7	8.8	2.5	5.1	.....	.....
Metal-spun pipes	2.2	3.4	1.6	2.4	3.8	5.9	1.5	2.3	5.4	8.4
Sand-spun pipes	1.7	2.6	1.2	1.9	5.8	9.0	2.3	3.5	.....	.....
Seamless steel pipes	2.3	3.6	1.8	2.8	4.0	6.2	1.9	3.0	.....	.....
Welded-steel pipes (as-rolled)	2.4	3.8	1.7	2.7	3.6	5.5	1.4	2.2	5.5	8.6
Welded-steel pipes (pickled)	.....	.....	1.3	2.0	.....	.....	.....	.....	.....	.....
Steel flats	2.4	3.8	1.6	2.5	4.6	7.3	2.6	4.0	6.9	11.0

NOTE: Weight losses are averages for triplicate specimens.

TABLE II

RATING FOR BARE PIPE

Material	Salt Marsh		Keuper Marl		London Clay		Moist Neutral Clay		Aggregate		Overall Order of Merit
	Pitting	Weight Loss	Pitting	Weight Loss	Pitting	Weight Loss	Pitting	Weight Loss	Pitting	Weight Loss	
Cast Iron —											
Vertically cast	4	2	5	5	4	4	4½	5	17½	16	5
Metal-spun	5	3	4	2	2	2	3	2	14	9	3
Sand-spun	3	1	2	1	4	5	2	4	11	11	2
Steel—											
Seamless	1	4	1	4	1	3	1	3	4	11	1
Welded (as-rolled)	2	5	3	3	4	1	4½	1	13½	10	4

NOTE: Order based on pitting and weight loss.

LOWER ALLOYS developed for high temperature use

By C. L. Clark
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Low alloyed steels originally developed for high temperature bolt applications have been modified for use at 1100°F. This steel meets a minimum rupture strength of 30,000 psi for periods of 1000 hr at high stress. Contrary to British experience a prior high normalizing temperature does not increase the high temperature strength of the lower alloys. This treatment however does increase the strength of 12 Cr stainless grades. Find good hardness in 17-22V forgings.

During the past few years considerable effort has been expended in the development of alloys to meet high temperature requirements of military equipment. Although many of the applications for which these alloys are intended are of relatively short duration, up to 1000 hr, the investigators in this development program have evidently proceeded on the theory that a direct relationship exists between high temperature strength and alloy content.

As a result many so-called superalloys have been developed which contain less than 50 pct Fe. Furthermore, the alloying elements present in most of them are extremely critical at present, such as columbium, cobalt, tungsten and nickel. Consequently, the production of these alloys in appreciable quantities causes a terrific drain on available supply and other industries, also vital to the war effort, have difficulty in securing their normal lower alloyed steels for high temperature applications.

A field does exist for these superalloys, but proper attention has not been given to the possibility of using low alloyed steels at temperatures up to at least 1100°F, and in certain applications even higher. Until recently the operating temperature of jet engine parts were such that lower alloys were not tried, although such grades could have been used in cases. Now with air cooled designs planned for hot jet parts the lower alloys can be expected to be used in large tonnages in the new engines. Until full production of the new engines is reached the lower alloys may also be used in the older engines.

A good example of where a low alloy steel has rendered excellent service at extreme temperatures is aircraft brake discs. Even though the surface temperature during braking may reach 1700°F, or higher, a steel widely used has a total alloy content of about 2.0 pct.

This general lack of interest in the low alloyed steels probably results from the fact that most of the available high temperature

TABLE I

REQUIREMENTS OF AN EMERGENCY ALLOY

(1) Low alloy content, using minimum of critical elements.

(2) Max high-temperature strength through simple heat treatment.

(3) Malleable in all ordinary hot working methods.

data is for annealed material, and in this condition of heat treatment the strength is relatively low. The ASME Boiler Code may also have contributed indirectly to this lack of interest for in their establishment of allowable stresses as no credit is given for the effect of heat treatment, except with bolting steels.

The English have already made considerable progress in the use of the lower alloyed steels and they are now using these alloys in many applications in which the super-alloys were formerly used. Likewise, considerable interest is now being shown in this country in these steels.

Any development program of alloys for military equipment, or for other applications during emergencies, should meet the major requirements shown in Table I. A steel meeting these requirements, designated as Timken 17-22A(S), was developed several years ago primarily for high temperature bolting applications. The mean analysis of this grade is: 0.30 C, 0.80 Mn, 0.70 Si, 1.25 Cr, 0.50 Mo, and 0.25 V. The properties of this steel were such that it readily adapted itself to aircraft brake discs and other military equipment. The effects of both temperature and hardness variations (heat treatment) on the rupture strength are shown in Fig. 1. When heat treated, by normalizing and tempering, to about 300 Bhn this steel has outstanding rupture strength at 1000°F, the stress for rupture in 100 hr being of the order of 60,000 psi.

However, the rupture strength of 17-22A(S) decreases rather rapidly above 1000°F, to a value of 20,000 psi at 1100°F for a fracture time of 1000 hr. For certain military equipment at least, a minimum 1000 hr rupture strength of 30,000 psi at 1100°F is desired.

In the attempt to meet the higher properties several heats incorporating modifications in the analysis of 17-22A(S) were melted in a 300 lb induction furnace and rolled into 1 in. diam bars. These steels were then subjected to

TABLE III

CONCLUSIONS ON NEW ALLOYS

Tested at 1100°F for 1000 hr

1. 0.20C, 0.25V. modified grade, best of new alloys.	Satisfactory rupture strength and good elongation to fracture.
2. Tungsten, boron grade.	Highest rupture strength but poor elongation to fracture.
3. Titanium, molybdenum grade.	Satisfactory rupture strength and high elongation to fracture.
4. High normalizing temperatures make new steels brittle at 1100°F.	

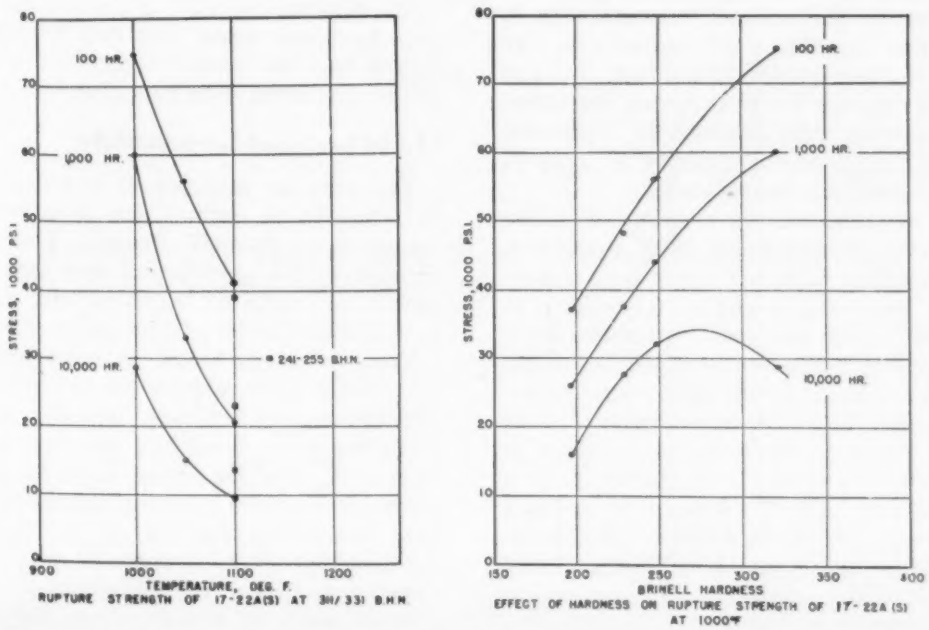


FIG. 1—Stress-rupture characteristics of Timken 17-22A(S), a low alloy steel for 1100°F service.

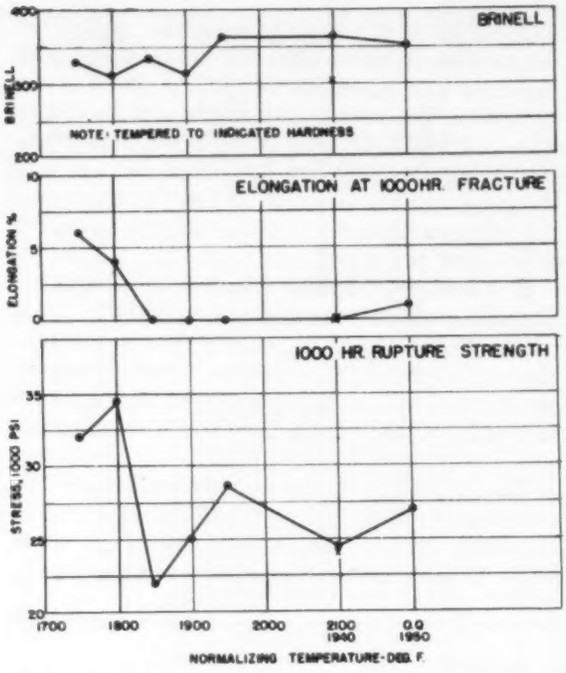


FIG. 2—Effect of heat treatment on 1100°F rupture strength of 17-22V steel (Heat A80).

Lower alloys for high temperature (continued)

1100°F rupture tests in various conditions of heat treatment. The analyses, heat treatments, hardnesses and 1000 hr rupture strength values are given in Table II. The estimated elongation to fracture in 1000 hr is also included.

The main variations considered in the 17-22A(S) analysis were reduction of the carbon to the 0.10 and 0.20 pct levels, an increase in the vanadium content in steps up to 0.80 pct and the addition of 0.50 pct W. Certain of the heats also contained boron, titanium, and these two elements together. That heat treatment has an effect on the high temperature strength is shown in Fig. 1 which portrays the effect of variations in hardness on the rupture strength of 17-22A(S) at 1000°F. In this case, the variations in hardness were obtained by tempering the material originally normalized at 1725°F, at various tempering temperatures.

English investigators have shown that the higher solution temperatures, 1950° to 2100°F, may also produce superior high temperature strengths. They also found oil quenching to be superior, in certain cases, to normalizing which is contrary to most experiences in this country. In order to check these various matters, several different heat treatments were applied to certain of the steels, as indicated in Table II. The stresses, corresponding to a fracture time of 1000 hr, are included in Table II while Fig. 2 shows the effect of heat treatment on the rupture strength of Timken 17-22V steel (Heat A80). Many of the results are shown graphically in Fig. 3.

The results obtained to date from the 1100°F tests permit the conclusions shown in Table III. When all factors are considered, Heat A80, designated as Timken 17-22V, appears to be the best of the low-alloyed steels. Its 1000 hr rupture strength at 1100°F is about 35,000 psi and it differs from the standard 17-22A(S) analysis only in that it contains 0.20 pct rather than 0.30 pct C, and 0.80 pct rather than 0.25 pct V. It can be readily hot worked at temperatures up to at least 2250°F and the best rupture strength is developed by a simple heat treatment consisting of normalizing from 1800°F followed by tempering to 300/350 Brinell. Elongation to fracture for 17-22V in 1000 hr at 1100°F, is about 5.0 pct, which is believed ample for the intended applications.

High normalizing detrimental

Heat A113, a modification containing tungsten and boron, has a somewhat higher rupture strength but the elongation to fracture in 1000 hr is only about 1.0 pct. On the other hand if a very high degree of ductility to fracture is desired, then Heat A114, a titanium modification of 17-22A(S) with 1.0 pct Mo, offers promise for its rupture strength is nearly the same as 17-22V but the elongation to fracture is 16 pct.

Insofar as the most suitable heat treatment is concerned these results do not check those who advocate high temperature solution temperatures. As the normalizing temperature was increased to the level recommended by the English the strength remained constant, or decreased, but the steels became very brittle at 1100°F, showing elongations to fracture of 1.0 pct, or less, Fig. 2.

The results discussed thus far were obtained on 1 in. diam bar stock rolled from 300 lb induction furnace ingots. In order to determine the effect of size melt as well as section size of the heat treated part, a one ton electric furnace heat was made, cast into a 14 in. ingot, forged to 7 in. square bloom and then upset forged into 22 in. diam pancakes, by 2 in. thick.

17-22V has good hardenability

The pancake forgings of 17-22V were then heat treated by normalizing from 1800°F and tempered to 323/337 Brinell. The hardness throughout the section was very uniform, thus indicating sufficient hardenability to permit normalizing sections of at least this size.

Tests were conducted at room temperature and 1100°F on specimens cut from this forging and the results obtained, together with those from the 1 in. diam bar stock, are given in Table IV. For the given hardness level the room temperature physical properties of the heat treated forging are very acceptable and the 1100°F rupture strength is even somewhat superior to that of the bar stock.

Since steels of this type are also receiving attention for service at 1000 and 1100°F under

TABLE II

STRESS-RUPTURE CHARACTERISTICS AT 1100°F OF LOW-ALLOYED CR-MO-SI-V STEELS

Heat Number	Type Analysis						Heat Treatment Deg. Fahr.	Brinell Hardness	1000 Hr Stress Rupture Values	
	C	Si	Cr	Mo	V	Others			Strength	Elongation
A79	0.10	0.75	1.30	0.50	0.25	0.67 Ti, 0.04 B	N. 1950, T 1200 N. 2100, T 1100	128 217/228	20,000 27,000	10 10
A79	0.09	0.60	1.29	0.54	0.41	.....	N. 1750, T 1200 N. 1950, T 1200 OQ. 1950, T 1200 N. 2100, 1940, T 1200 N. 2100, 1940, T 1290	183 241 285 197 179	22,000 26,000 26,000 25,000 25,000	10 5 0 8 6
A80 (17-22 V)	0.22	0.60	1.34	0.84	0.89	.....	N. 1750, T 1200 N. 1950, T 1200 OQ. 1950, T 1200 N. 2100, 1940, T 1200 N. 2100, 1940, T 1290 N. 1800, T 1285 (½) N. 1800, T 1200 N. 1850, T 1225 N. 1900, T 1250	331 363 352 363 302 311/331 302/321 331/341 311/331	32,000 27,000 27,000 24,500 23,000 34,000 34,500 22,000 25,000	8.5 0 1 1 0 5 5 0 0
A88	0.22	0.62	3.00	0.63	0.79	0.55W	N. 1850, T 1200	341	31,000	10
A94	0.28	0.71	1.52	0.51	0.77	0.48W	N. 1850, T 1275 N. 2100, 1940, T 1290	302/311 318/332	32,000 30,000	1 0
A111	0.33	0.68	1.35	1.04	0.27	.....	N. 1850, T 1275 N. 2000, T 1275 N. 1750, T 1225	311/321 293/321 331/341	27,000 23,000 26,000	1 0 2
A112	0.32	0.85	1.45	0.55	0.76	0.41W, 0.015B	N. 1850, T 1250 N. 2000, T 1275	321 341	35,000 29,000	3 0
A113	0.32	0.86	1.43	0.55	0.76	0.43W, 0.0015B	N. 1850, T 1250 N. 2000, T 1275 N. 1800, T 1250	331 331 302	38,000 38,000 27,000	1 1 12
A114	0.30	0.68	1.36	1.04	0.31	0.82Ti	N. 1950, T 1250 N. 2050, T 1250	321 321	34,500 32,500	16 2
A123	0.17	0.64	1.23	0.50	0.44	.....	N. 1800, T 1225 N. 1850, T 1225	311 321	32,000 32,000	1 2

Code: N = Normalized. OQ = Oil Quenched. T = Tempered 6 Hrs, unless otherwise indicated. Elong = Estimated elongation to fracture in 1000 hrs. A = 300 lb. induction heat.

TABLE IV

PHYSICAL PROPERTIES OF TIMKEN 17-22V STEEL

Normalized 1800°F, Tempered 1200°F

A. Short-Time Tensile Properties:

Original Stock	Temperature Deg. Fahr.	Tensile Strength	Yield Stress		Proportional Limit	Elongation in 2 in., pct	Reduction of Area, pct
			0.2 pct	0.1 pct			
1 in. Bar	Room	139,500	114,000	.....	102,000	17.5	64
Forging*-R	Room	142,000	128,000	.....	.....	17.5	52
Forging*-T	Room	147,000	132,000	.....	.....	17.5	53
1 in. Bar	1100	71,000	64,000	59,500	32,500	25.0	69

B. Stress-Rupture Properties at 1100° F:

Original Stock	Temperature Deg. Fahr.	Stress, 1000 psi, for Rupture in	
		100 Hr.	1000 Hr.
1 in. Bar	1100	50,000 (8 pct)	35,000 (5 pct)
Forging*	1100	50,000 (8 pct)	37,000 (5 pct)

Code: *=Heat treated as pancake forgings, 22 in. diam. x 2 in. thick. R=Radial specimens. T=Tangential specimens. ( )=Total elongation to fracture.

TABLE V

STRESS-RUPTURE CHARACTERISTICS AT 1100°F OF 12 CR TYPE STEELS

Heat Number	Type Analysis						Heat Treatment Deg. Fahr.	Brinell Hardness	1000 Hr Stress-rupture Values	
	C	Si	Cr	Mo	V	Others			Strength	Elongation
A95	0.12	0.16	11.32	0.81	0.18	0.60Cb	N. 1850, T 1200 OQ. 2115, T 1200	293 302	35,000 46,500	15 13
02236	0.084	0.10	10.64	0.80	0.18	0.32Cb	N. 1850, T 1200 OQ. 2115, T 1200	277 285	32,000 40,000	15 10
02178	0.15	1.22	11.84	3.0	....	0.12Zr	N. 1900, T 1150 OQ. 2115, T 1200	321/352 288/304	29,000 29,000	16 16
02287	0.16	1.05	11.85	2.85	....	1.52Ni	N. 1850, T 1200 OQ. 2115, T 1200	321/331 288/304	21,000 20,000	30 30

Code: N=Normalized. OQ=Oil Quenched. T=Tempered, 6 Hrs. Elong.=Estimated elongation to fracture in 1000 Hr. A=300 lb. induction heat. O=1 Ton electric arc heat

high stress conditions, three of them were included in this investigation. Data with respect to their composition, heat treatment, hardness and rupture characteristics at 1100°F are given in Table V, while their rupture strengths are also included in Fig. 3 for comparison with the lower alloyed steels.

On the basis of these results two conclusions appear to be in order. First, that columbium must be present to obtain the greatest rupture strength at 1100°F, and second, that higher than normal solution temperatures must be used in either the normalizing or quenching treatment. Steels of this type, and with this heat treatment, are being widely used in England.

total alloy content, minimum amount of critical elements, and ease of heat treating and hot processing, 17-22A(S) steel is believed to be the most suitable for service at 1000°F under the given conditions. Its total mean alloy content is only 2.0 per cent, it is free of nickel and contains only 0.50 molybdenum. Its 1000 hour rupture strength at 1000°F is 60,000 psi.

On this same basis, 17-22V is believed the most suitable for service at 1100°F. Its total mean alloy content is 2.55 pct. It is also free of nickel and contains only 0.50 molybdenum. It differs from 17-22A(S) in that its carbon content is 0.20, rather than 0.30, and its vanadium content 0.80, rather than 0.25. Its 1000 hour rupture strength at 1100°F is 35,000 to 37,000 psi.

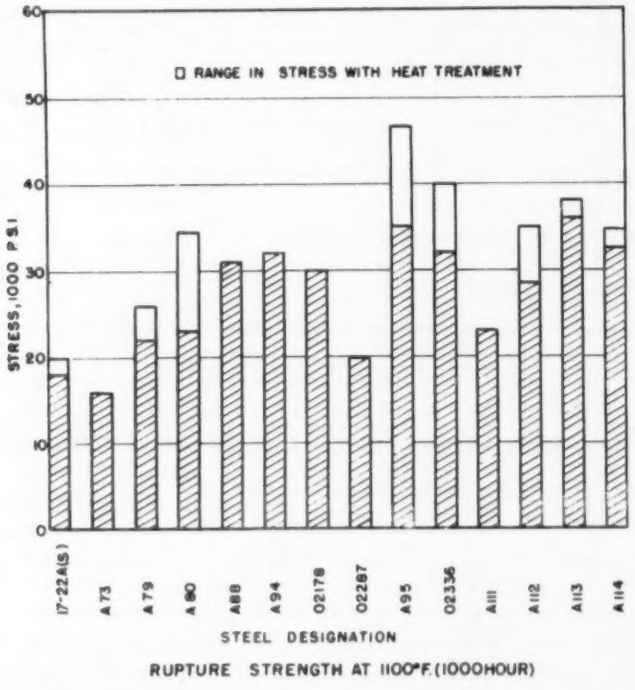


FIG. 3—Rupture strength at 1100°F for 1000 hr on some of the steels studied by Timken.

The 1000 hr rupture strength values at 1100°F, for the higher solution treatments, are 40,000 and 46,000 psi. The higher value was obtained on a 300-lb induction heat and the lower on a 1-ton electric furnace heat. This might indicate the size melt, size ingot or degree of reduction to be factors. To check this pancake forgings, like those previously discussed, were made and the 1100°F rupture strength was found to agree with that of the larger heat, i.e., 40,000 psi.

The results presented definitely show that low-alloy steels are available for relatively short life applications under high stress at 1000 and 1100°F. On the basis of 1000 hour rupture, the maximum stress level at 1000°F. is 60,000 psi and at 1100°F, 35,000 to 37,000 psi.

When all factors are considered, including

If a still higher rupture strength at 1100°F is desired certain of the 12 Cr type steels, and especially those containing columbium, are available. These steels are, of course, much higher alloyed, columbium is critical, and while chromium is not yet it might become so at some later date. Likewise, because of the possibility of these steels being two phased, trouble might be encountered in some hot working operations, such as upset forging.

While this development program is by no means complete it was felt advisable to present the results obtained to date as it is believed the properties of 17-22A(S) and 17-22V are such that they are capable of rendering satisfactory service at 1000 and 1100°F, respectively, under highly stressed conditions.

Jet part machining time cut from 30 hr to 5 min with piercer

A unique new hydraulic piercing machine does a job on jet engine shroud rings in 4½ min which formerly required 30 hr. The machine pierces slots in the shroud rings into which blade tips fit, and may also be utilized for making holes in such items as automotive tire rims or other circular parts.

The former method of producing these slots, because they must be very accurately located and sized, involved drilling, reaming, and milling. It required as long as 30 hr to complete making the slots in one shroud. The new machine does the job in less than 5 min. It was originally developed by Mueller Engineering Co., Dearborn, Mich., and is being built by Danly Machine Specialties, Inc., Chicago.

The machine mounts a ring horizontally and indexes it past a piercing unit. An interchangeable master index ring is used to accurately locate the slots. Constant torque is applied to the index table to prevent backlash.

To operate, an operator places a part on the locating ring, and locks it by means of a handwheel which moves the clamping fingers. He then sets in motion the automatic cycle.

A C frame moves into piercing position until the die makes contact with the surface of the part. Then a power cylinder rapidly approaches under primary fluid pressure until the stripper plate contacts the part. Then pressure rise in the primary system causes the spool of a selector valve to shift. This causes a 5:1 continuous booster to be actuated, to supply high pressure fluid for the actual piercing operation. When the time-control relay times out, the flow of hydraulic fluid is reversed, the punch is withdrawn, and the power cylinder returns to open position. The C frame slide also opens.

As soon as the power cylinder has returned, a limit switch is actuated directing fluid to the locking latch cylinder of the index mechanism. The table starts rotating as soon as released. The latch cylinder reverses as soon as it is fully open, causing the latch to return and engage the next notch in the index ring. This stops the table rotation. As soon as the latch reaches its engaged position, it hits a limit switch which starts the piercing cycle again. This sequence of operations continues until the ring has indexed through 360°.

The hydraulically operated C frame slide eliminates distortion of the part while piercing is going on. Actual force to perform piercing is equalized; the part is merely pinched between punch and die with the same force on both sides.

HYDRAULIC piercing machine which puts blade tip slots in jet engine shroud rings. Part is mounted on table, left.

POWER TRANSMISSION through belts

No. 3 of a series

By John E. Hyler
John E. Hyler & Associates
Peoria, Ill.

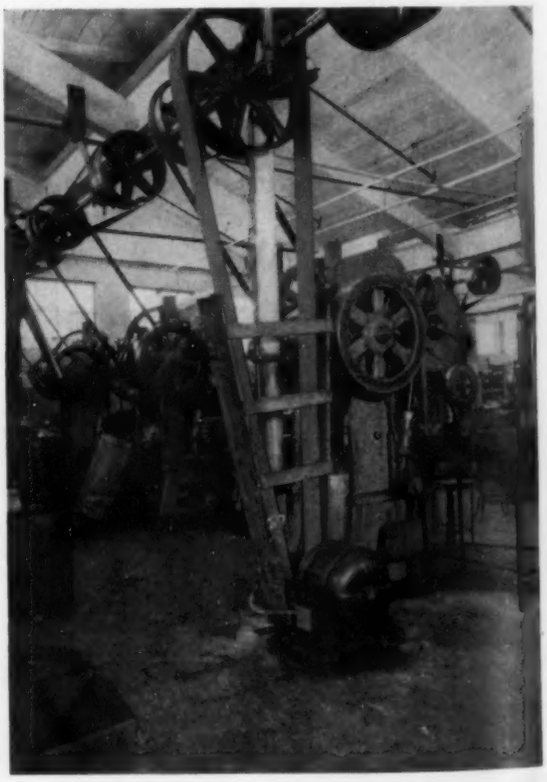
Group drives using flat leather belts still find considerable use in metalworking plants, as do flat belt drives on individual machines. But V belt drives now are more common. Special V belt drives are available for speed changing and automatic tension control.

Though long line shafts and overhead horizontal belt drives are now seldom seen, the flat belt still has many uses in metalworking plants. Group drives, using a relatively short line shaft, still find frequent use in effecting power economies.

There are certain characteristics of flat belting which cannot readily be obtained in any other type of drive. One of these is a drive required to slip in moderation under conditions of shock or overload. Another is in cases where belts must be shifted, usually in connection with an idler drive. Flat belts can often be trained over one pulley and under another to better advantage than other drives. Leather belts are made in both single and double-ply types. A few are made triple-ply. Thickness of leather belting is generally listed in some multiple of 1/64 in.

In some types of leather, single-ply belts may be obtained as thin as 9/64 in., or as thick as 15/64 in. Variations from ¼ to 23/64 in. are found in double-ply belts. A given thickness is average for uniformity in thickness of a leather belt is seldom absolute.

Both oak-tanned and chrome-tanned leather belts may be obtained. In addition, some leather belting is combination-tanned. Chrome-tanned belts usually have higher uniformity and greater



GROUP DRIVE, with single floor-mounted motor driving several punch presses through leather belts.

power transmission capacity than oak-tanned belting. They are more flexible and therefore cling more firmly to the face of the pulley. However, this flexibility reduces their strength along the edges. It follows that mineral-tanned belts are not so good for use with a belt shifter as oak-tanned belting. Too, where belts are run on step cone or flanged pulleys, where their edges may do some rubbing against the shoulders of such pulleys, the stronger edges of oak-tanned belting will stand up better.

On the other hand, where belts are exposed to oil, a chrome-tanned belt is superior to one that is oak-tanned. Since each type of tanning has definite advantages some belt manufacturers make up two-ply belts having one ply of oak-tanned leather, while the other ply is either combination or mineral-tanned. Combination belts of this type are generally used on drives where they are acted on by a belt shifter, but where they also need the better pulley-gripping quality of mineral-tanned belts.

If a belt is dirty, its actual working face is being held out of intimate contact with the pulley faces. Dressing is not applied to such a belt. Instead, it is cleaned with naphtha or carbon tetrachloride.

If a very large amount of dirt is adhering to the face of a belt, a blunt-edged scraper is used to remove the major portion before the belt is washed.

Either rubber or canvas belting is often used, but ordinary rubber belting should not be employed where there is much oil and grease. Oil-proof rubber belts are obtainable, made from Neoprene or some other synthetic rubber.

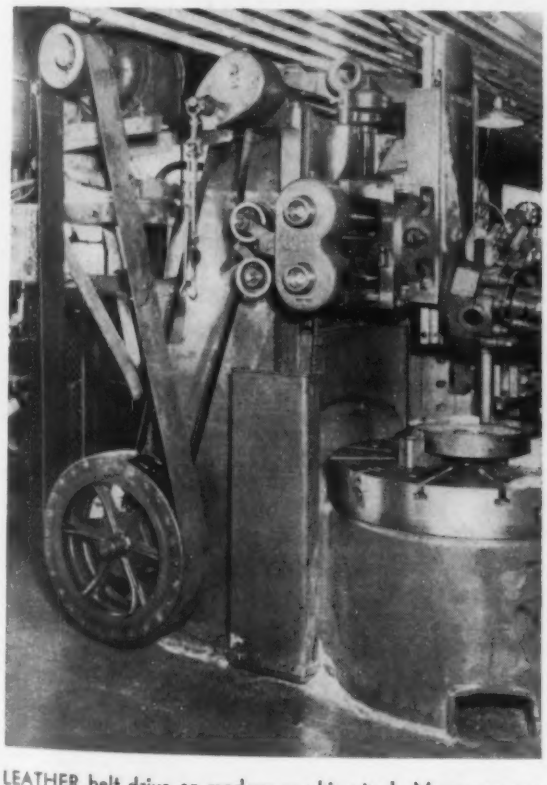
In general, double-ply leather belting should be used only on pulleys of considerable size. Usually, the smaller the diameter of a pulley, the thinner the belt that should be fitted.

Thinner belts and smaller-diameter pulleys call for smaller belt hooks or fasteners. If hooks of too-large size are used for thin belts, over small-diameter pulleys, the joint will not hug the pulley properly.

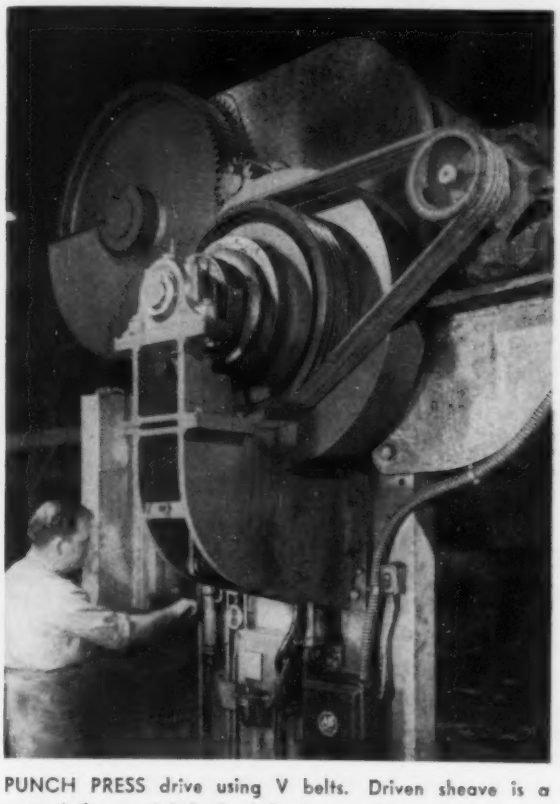
Before a belt can run straight and true the ends which are joined together must be cut perfectly square. Or if one of the ends is out of square, the other end must be out the same amount in the opposite direction. Without a square or a belt-cutting machine it is possible to insure a straight-running belt by lining up the two ends of a belt, turning one end completely over on the other, and trimming both ends at once. But it is best to use belt cutters.

Both rubber and leather belts can be made endless. A leather belt can be made endless

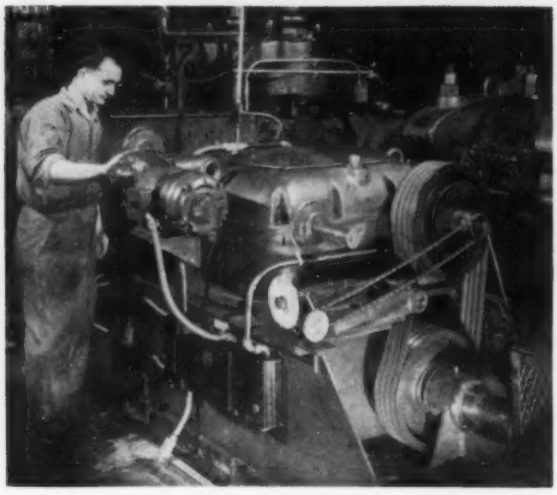
This is the last of three articles on power transmission by Mr. Hyler. Other articles in the series were: Power Transmission Through Flexible Couplings, The Iron Age, December 10, 1951, p. 77; and Power Transmission Through Chain Drives, The Iron Age, January 31, p. 100.



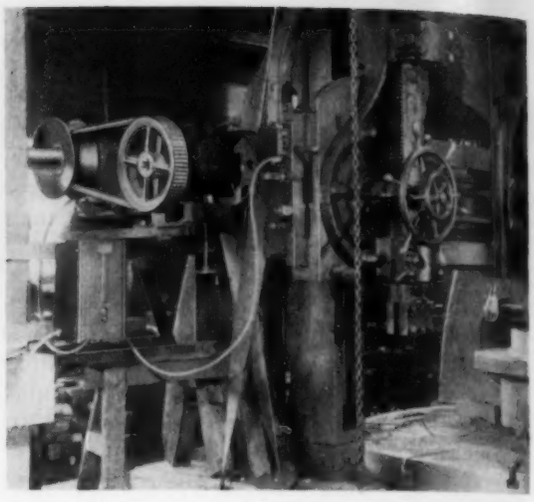
LEATHER belt drive on modern machine tool. More common is use where belt-shifting devices are desirable.



PUNCH PRESS drive using V belts. Driven sheave is a part of the special flywheel-clutch assembly.



ADJUSTABLE speed over a 3:1 range is provided on this machine tool through use of a V belt drive with special driven sheave with adjustable diameter.



AUTOMATIC device maintains tension constant as winder coil increases in diameter. Special torque sheave slips under too much tension, causing operation of speed changer.

Belt drives (continued)

in the shop where used by tapering off the two ends, applying belt cement, clamping the joint and allowing the cement to set. Making a belt endless provides a drive more suitable for operation at high speed, especially where single-ply belts are operated at high speed around small-diameter pulleys.

In the field of machine tools, for instance on high-speed grinder and lathe applications and high-speed sensitive drilling machines, belts woven endless from cotton or nylon are often applied. Since they are woven absolutely endless, these belts impart no vibration to a spindle. Some of these belts are made with reinforced edges, practically equal to a selvage edge. Therefore, edge fraying is practically eliminated.

A timing belt is flat in the nominal sense but which has teeth that make positive engagement with grooves cut in the pulley faces. Because of the teeth, and grooves, speed of the driver and driven pulley synchronizes perfectly.

Such belts are provided with steel cable pulling elements, which give enormous tensile strength and eliminate stretch. The body of these belts is made of Neoprene. Belt drives of this type are often used for ordinary power transmission besides being employed for synchronizing drives.

The high efficiency and various functional advantages of V belts are so well known that they need little comment. But V belt drives are undoubtedly subjected to more abuse than flat-belt drives in many shops. Proper selection of V belts is highly important, but proper installation and care of those belts is even more so.

Wedging action of the belts in their sheaves allows them to pull properly with much less tension than is required for many flat-belt drives. If V belts are run too tight they will have a relatively short life. The same thing is true if they are run too loose. When run too loose, they slip in their sheaves. This will cause rapid wear. On any multiple V belt drive where some of the belts are slightly shorter than others, some of them are sure to have a short life. It is not possible to set the pulleys on such center distances so that looser belts will be sufficiently tensioned, without getting too much tension on the tighter belts.

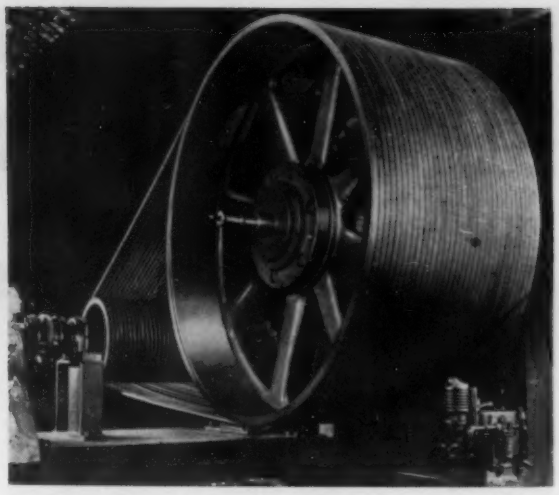
Correct alignment of sheaves in which V belts run is more important than correct alignment of flat-belt pulleys. Care should be employed not to let V belts rest for long periods of time on sheaves without turning them over by hand, or without loosening their tension. Where machines are idle for a long period of time, and their V belts have been left undisturbed, the belts may take a set to their curved form around the pulleys. This can be avoided by turning such belts over by hand occasionally.

Concave belts reduce wear

When ordinary V belts run around sheaves, they tend to bulge on their sides. Some V belt manufacturers have overcome this bulge by forming the belts with somewhat hollow sides. The result is the normal bulge brings the belt sides approximately straight. There are also cog-belt drives which permit flexure of the V belt without much bulging effect taking place.

V belts are obtainable which have steel cables running through them, for use where the drive is subjected to heavy pull and must not stretch. Some V belts of special type are available for use where extreme conditions of static are involved, or for use under very oily or hot conditions. Now available are double-angle V belts. This type of belt may be run over one pulley and under another, applicable to the

V BELT drive on a swing grinder being used to clean alloy ingots. Stepped sheaves allow increasing speed to keep surface speed relatively constant as wheel wears.



HUGE 32-belt drive furnishes power to an Ingersoll aluminum scalping machine. Large sheave is 108 in. in diameter; transmits 800 hp at 450 rpm.

over-and-under type of drive the same as a flat belt or a roller chain.

V belts are made in many different standard endless lengths. Many try to arrange different V belt drives in the plant to use the same length of V belt, as far as possible. Some have been quite successful in thus limiting the number of different lengths of V belts which must be kept on hand as replacements.

However, many users purchase rolls of open-end V belting. They cut belts to length as required and join them together with V belt fasteners. This can be done on drives where only belts of this type are being employed. But V belts joined together with fasteners should not be used with endless V belts on a multiple-belt drive. There are different stretch characteristics in the two different constructions. This will cause uneven distribution of the load between the two kinds of belts.

Use of V belts fasteners is not the only answer to the problem where such belts must be applied to closed drives. It is also possible to service such drives with V belts made up of links. The separate links of the belts are provided with studs and holes to allow links to be coupled together. Therefore, a V belt of link type can be coupled together after threading the ends of it through closed-end drives of any kind, the same as though cut-to-length V belts incorporating fasteners were being employed. V belts of link type may be quite easily adjusted for length and for tension, by simply adding or removing a link as necessary.

It is possible to keep a reasonable amount of such belting on reels, in a number of widths. Where this is done, one has potential belts of any required length always at hand, the same as when open-end V-belting is kept in rolls.

One V belt drive operates with a torque sheave. This is a two-part sheave, consisting of a hub and a rim linked together through a compression spring. The arrangement is such that an excess of torque or pull of the V belts on the grooved sheave rim compresses the spring and allows the hub to revolve inside the rim.

The hub is keyed to the input shaft of a variable speed device. A micro-switch is mounted on the sheave. As soon as there is the slightest relative motion between the hub and the rim of the torque sheave, the micro-switch closes a circuit, which cuts in a pilot motor. The pilot motor operates the speed-changing mechanism of the variable-speed device.

Automatically maintains tension

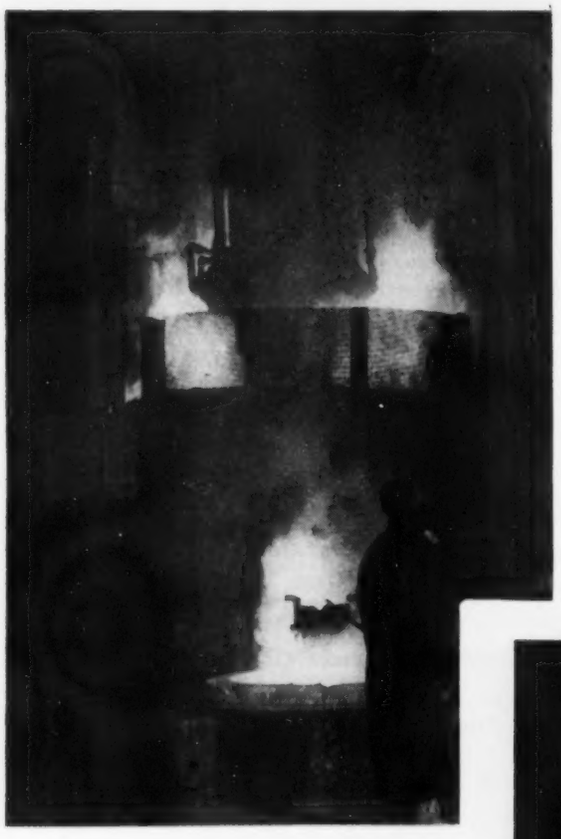
One application of this equipment is on a winding roll, or blocker, as it winds up thin metal strip coming from between two rolls. As the strip is rolled up, the diameter of the coil gradually increases. At constant rotational speed, it increases the lineal speed at which it pulls the strip, and therefore increases its tension. The purpose of the V belt drive with torque sheave is to slow down the rotational speed of the winder as necessary to maintain uniform tension on the strip.

This action may take place several times per minute, as needed to maintain a consistent degree of tension on the strip. A handwheel or chain-operated sprocket is provided on the torque sheave, by means of which operating tension may be adjusted. After a strip is through the thinning rolls, and is completely wound on the blocker, rotative speed of the winder will of course be too low for beginning the winding of a new strip.

The operator then touches a button which operates the pilot motor in reverse. The pilot motor then runs until it has returned the variable-speed mechanism to the point where rotary speed of the winder is again correct for starting the strip.

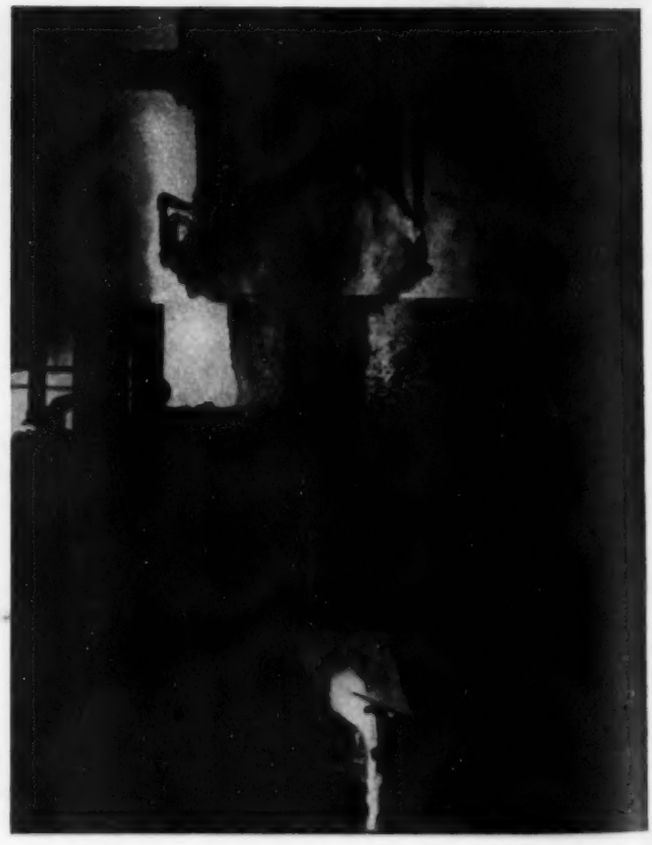
LOW-CARBON FERRO-CHROME-SILICON

cuts stainless ingot costs



By N. B. McFarlane
Asst. to president
Pittsburgh Metallurgical Co., Inc.
Niagara Falls, N. Y.

For each pound of chromium in finished stainless ingots, about 7 to 8¢ is saved whenever producers substitute low-carbon ferro-chrome-silicon for low-carbon ferrochrome. This alloying material can be used in practically any kind of stainless production and frequently it reduces melting time.



The introduction and successful use of low-carbon ferro-chromium-silicon is one of the outstanding recent developments in steelmaking. Yet little has been published about this source of chromium. Today, virtually all stainless producers are using the material to reduce costs and improve product quality. Used with high-carbon ferro-chrome, this alloy is helping to solve the shortage of chrome-bearing alloys.

Pittsburgh Metallurgical Co., Inc., in September, 1940, first produced a small quantity of low-carbon ferro-chrome-silicon. The war years prevented further production and development of this alloy, and it was not until June, 1945, that this alloy was offered again.

UNIVERSITY OF MICHIGAN LIBRARIES

The alloy is produced in electric furnaces by carbon reduction from selected ores. It is now supplied in two grades of the compositions given in accompanying table and is supplied in lump form as well as in standard mesh sizes for special requirements. One of the interesting features of this alloy is the price. The chromium content is charged for at the same rate per lb as in high-carbon ferro-chrome. The silicon costs the same as in 50 pct ferrosilicon. Thus, the chromium costs 21.75¢ per lb v. 30.50¢ for low-carbon ferrochrome of the same carbon content. This is a saving of 8.75¢ per lb of chromium.

The cost of chromium contained in one ton of type 430 stainless made by the old "virgin metal" method will amount to $103.70, assuming 17.00 pct chromium in the metal and low-carbon chromium at 30.50¢ per lb. In recent years melting practices have been developed so that the same quantity of chromium can be obtained for as little as half the given figure.

Plain carbon scrap melted first

In the virgin metal and carbon steel scrap practice, the plain carbon scrap is melted down first. Stainless scrap practice can be applied through many different methods. It depends on the specific conditions of the operation. In any case, a certain percentage of stainless scrap generated in the plant, with or without purchased stainless scrap, is part of the charge. In addition, some high-carbon ferrochrome can be used if desired. The carbon can be oxidized to the required content by using scale or iron ore during the melting or by using oxygen after the bath is melted.

The original chromium in the charge oxidizes and becomes part of the slag. The amount depends on the percentage of chromium in the charge, the type of oxidizer used and the temperature at which oxidation occurs. When the bath has reached the desired carbon limit, the chromium oxidized during this period is reduced with ferrosilicon. The amount of lime required to maintain adequate basicity in the slag is also added.

Charge contains stainless scrap

In the chrome ore practice, the charge contains a certain percentage of stainless scrap. The balance of the metallic chromium comes from chrome ore reduction. The melting down period and carbon oxidation is similar to stainless scrap practice, except that it may be carried out in chrome-lined furnaces. Part of the chrome ore may be charged on the bottom of the furnace and the balance during the melting down period or even while reducing the slag.

Low-carbon ferro-chrome-silicon, when properly used, helps the operator achieve these lower costs. Calculations are based on a 50,000-lb heat of type 430 stainless containing 0.07 pct carbon, 17.00 pct Cr and 0.60 pct Si. It is assumed that the low-carbon ferro-chrome-silicon has 38.00 pct Cr and 45.00 pct Si.

There are several methods of calculating a virgin metal-carbon scrap charge. Usually, it consists of plain carbon scrap, containing 0.30 to 0.50 pct C. The charge may contain iron ore or mill scale as well. The higher carbon content insures a lively boil, freeing the bath from gases during the melting period.

A tapping weight of 50,000 lb was chosen with a chrome content 17.00 pct. An addition of low-carbon ferrochrome, and a 100 pct Cr recovery was assumed. An actual addition of 8500 lb of chromium is thus required. At the present price of this grade of low-carbon ferrochrome, of 30.50¢ per lb, the total cost would be $2592.50 or $103.70 per ton of ingots. Since this virgin metal-carbon scrap practice is considered the most expensive, it is seldom used.

The points at which low-carbon ferro-chrome-silicon can be introduced in the above practice, replacing low-carbon ferrochrome, are relatively limited. However, additions can be made at two stages during the melting period. The first is applied after the carbon is boiled down to 0.04 pct and the oxidizing slag removed. Because a bath containing 0.04 pct C is highly oxidizing and since some steelmakers prefer to add ferrochrome alloys only to a bath containing roughly 0.20 pct Si, a total of 0.60 pct Si must be added to obtain the desired 0.20 pct.

A saving on chromium

To add 0.60 pct Si to the bath, about 670 lb of low-carbon ferro-chrome-silicon containing 254 lb of metallic chromium (38.00 pct Cr plus 45.00 pct Si) is added in place of ferrosilicon alloys. Thus, 254 lb of chromium are obtained at a saving of 8.75¢ per lb of contained chromium, or a total of $22.00. The second stage at which low-carbon ferro-chrome-silicon is used is in the final adjustment of the silicon after the low-carbon ferrochrome is added.

Assuming it may require another 0.40 pct to meet specifications, this addition would contain an additional 169 lb Cr. In this case, the savings would be $15.00 over the cost of using low-carbon ferrochrome. The total saving is then about $37.00. On grades where the silicon specification is 1 pct or over, the saving would be correspondingly increased. In general, the quantity of chrome silicide used in the virgin metal-carbon scrap practice depends on the operator and method applied.

In stainless scrap practice, the quantity of

TWO GRADES OF L-C FERRO-CHROME-SILICON

	Standard Grade, Pct	High Chrome Grade, Pct
Chromium	33–34	38–41
Silicon	50–51	42–44
Carbon	Under 0.05	Under 0.05

scrap in the charge depends upon such factors as the requisite hot workability of the ingots, end product, and availability of purchased scrap. The trend is to use as much stainless scrap as possible. This reduces the quantity of low-carbon ferrochrome used to adjust the chromium specification.

Assuming that the charge is 50 pct stainless scrap, it would contain about 8.50 pct Cr. The rest would have to be added as low-carbon ferrochrome. For example, the charge would be the following: (1) Stainless scrap (17.00 pct Cr), 25000 lb; (2) straight carbon scrap, 19000 lb. Chromium content would be 4250 lb.

Silicon, 1 lb: chromium, 2.7 lb

By the time the carbon is oxidized to 0.04 pct, about half the chromium is usually oxidized. In conventional practice, the chromium is reduced from the slag, using ferrosilicon with the addition of lime. The theoretical amount of silicon required is determined from the reaction: $2\ Cr_2O_3 + 3\ Si - 4\ Cr + 3\ SiO_2$.

Therefore, it would require about 1 lb of silicon for each 2.7 lb of chromium reduced. However, excess silicon is essential. A certain portion of iron and manganese must be reduced so, a portion of the metallic silicon is oxidized and lost. As a result, the quantity of silicon used is about 30 pct higher than the theoretical amount required for the reaction between chromic oxide and silicon. Therefore, 1100 lb Si would be required to obtain at least 90 pct recovery from the scrap.

If low-carbon ferro-chrome-silicon is used in place of ferrosilicon alloys in quantities corresponding to 1100 lb Si, there will be an additional 930 lb of metallic chromium. This is added to the slag during reduction. It would give an initial savings of $80.00 per heat. If, as in the virgin metal-carbon scrap practice, the same lower-priced alloy is used for the final silicon, another $15.00 would be saved.

Regardless of what percentage of stainless scrap is used in the charge, there is always room for an addition of low-carbon ferro-chrome-silicon.

A variation of the stainless scrap practice uses high-carbon ferrochrome in the charge. This alloy is added to the charge of stainless scrap to bring the total chromium content up to 17.00 pct if necessary, because the oxidized chromium from high-carbon ferrochrome reduced back at 90 pct recovery is cheaper than adding chromium as low-carbon ferrochrome. The price of chromium in high-carbon ferrochrome is 21.75¢ per lb. Its 90 pct recovery figure increases the price to about 24¢ per lb.

The conventional charge for stainless scrap —high-carbon ferrochrome practice follows: (1) 25000 lb of stainless (17.00 pct Cr) scrap; (2) 6000 lb of high-carbon ferrochrome; (3) 17000 lb of straight carbon steel scrap; (4) 2000 lb of 75 pct ferrosilicon as reducing agent.

With low-carbon ferro-chrome-silicon, the charge would be: (1) 25000 lb of stainless (17.00 pct Cr) scrap; (2) 4200 lb of high-carbon ferrochrome; (3) 18000 lb of straight carbon steel scrap; (4) 3300 lb of chrome silicide alloy as a reducing agent.

High-carbon ferrochrome reduced by 1800 lb

The quantity of high-carbon ferrochrome would be diminished by 1800 lb and replaced by 1250 lb of chromium from chrome silicide.

The savings here are a matter of chrome recovery assuming 90 pct for the high-carbon chromium and 96 to 97 pct from the chrome silicide. Also by replacing the 1800 lb of high-carbon in the charge the chromium content is diminished by 2.50 pct. This results in faster carbon oxidation, and, therefore, less oxidation saving furnace time.

Another method of decreasing the cost of the metal in conventional practice is the use of the chrome ore method. In addition to the stainless scrap, a certain amount of chrome ore is charged and reduced with chrome silicide.

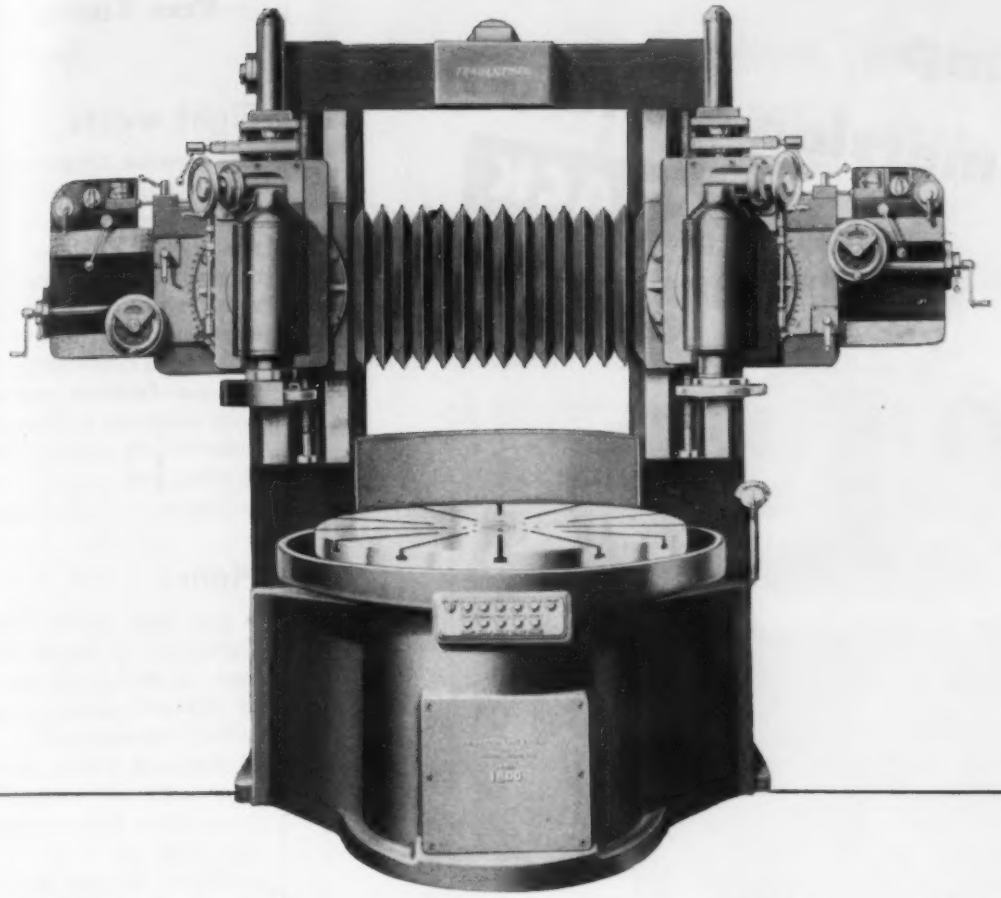
A typical example of a charge containing about 17.00 pct chromium in which about 4.00 pct of metallic chrome comes from chrome ore follows: (1) 25000 lb of stainless scrap (17.00 pct Cr); (2) 6000 lb of chrome ore (33.000 pct Cr); (3) 2500 lb of mill scale; (4) 16000 lb of straight carbon steel scrap; (5) 6500 lb of chrome silicide as a reducing agent; these figures are based on 90 pct recovery of chrome.

Produces lowest ingot cost

By using low-carbon ferro-chrome-silicon for the reduction in quantities corresponding to 2925 lb of pure silicon, about 2450 lb of metallic chromium is introduced during slag reduction. This method will produce the lowest ingot cost of all the practices mentioned. In this practice, the total amount of chromium from scrap in the charge is only 8.50 pct which creates conditions of melting which generally allow the carbon to melt in at 0.04 to 0.05 pct.

There is also a wide possibility of using low-carbon ferro-chrome-silicon as a final addition, adjusting chromium, silicon or both. Certain grades of stainless steel contain about 1.50 pct Si or higher. In a 50,000-lb heat where the final addition of 1.25 pct Cr and 1.50 pct Si is to be made, conventional practice would require the following additions: (1) 900 lb of low-carbon ferrochrome: (2) 1000 lb of 75 pct ferrosilicon.

The low-carbon ferrochrome is added first and a waiting period usually follows while it melts. Only then can the furnace operator add the ferrosilicon. Using low-carbon ferro-chrome-silicon for the final silicon addition, the waiting period is entirely eliminated. A saving on the cost of chromium of about $55.00 per heat is obtained.



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—Free Literature—

Continued

Fight waste

The Disston *"Fight Waste"* package contains a 72-p. booklet packed with information on how to get the most out of cutting tools. A series of pocket cards tells how to conserve steels and a leaflet urges everyone in production to help get scrap back to the mills. While written for foremen and supervisory help, everyone in the metalworking industry can benefit. *Henry Disston & Sons, Inc.*

For free copy insert No. 16 on postcard, p. 117.

Floors

A new 16-p. booklet *"How to Build Corrosion Resistant Floors,"* tells uses of acid brick and application of different types of cement. Detailed drawings of various types of floors as well as actual installation photos are shown. The booklet is designed for engineers and construction men faced with corrosion resistant flooring problems. *U. S. Stoneware Co.*

For free copy insert No. 17 on postcard, p. 117.

Industrial springs

Designers and manufacturers using flat springs as a power source will find a wealth of information in a new 20-p. brochure "Sandsteel Springs for Dual Power." Performance differences of various "qualities" of springs are described. How the springs are manufactured and various production and testing methods are described. *Sandsteel Spring Div., Sandvik Steel, Inc.*

For free copy insert No. 18 on postcard, p. 117.

Lubrication

Eleven ways to cut production costs through proper handling of lubricants are outlined in a new booklet. Savings begin in the oil storage room through proper handling. Improved methods of loading grease guns and standardized grease fittings are described. These and other tips on handling of lubricants will prove useful to maintenance and production men. *Stewart-Warner Corp.*

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Calculator

Required ton-pressures needed to pierce a given size hole in any thickness and type of metal may be quickly calculated with a Ward sliding scale. Ton-pressure for holes from 3/16 in. to 10 in. in diam in aluminum, rolled zinc, brass, copper, and in carbon and stainless steels are easily calculated. *Ward Machinery Co.*

For free copy insert No. 20 on postcard, p. 117.

Die sets

A new 12-p. booklet *"Save Tooling Time,"* presents the advantages and possibilities in time and cost reductions with precision die sets. Four major factors involved in die set convenience and efficiency are discussed. Machining and testing methods used to insure die set accuracy are described. *Danly Machine Specialties, Inc.*

For free copy insert No. 21 on postcard, p. 117.

Four-high mill

A Farrel 4-high mill designed to increase production in an aluminum foil plant is described in a new bulletin. The mill handles primary reduction of aluminum down to as low as 0.001 in. gage. Work rolls are 9 x 46 in. and the mill has 21 in. back-up rolls. Other features of the mill and auxiliary high-speed equipment are described. For efficient operation, 30 in. diam vernier dials are located at the top of the mill, one for each adjusting screw. An electrolimit foil gage is attached, and a main panel, with 25 controls, provides an operating point on the windup side of the mill. *Farrel-Birmingham Co., Inc.*

For free copy insert No. 22 on postcard, p. 117.

Metal on plywood

A new brochure, *"Rigidized Metal Armorply,"* describes a structural panel made by bonding a sheet of roll-embossed aluminum, stainless steel or other metal to exterior grade plywood. A variety of patterns is available to suit individual application needs. The panels are being used for bar equipment, deep freeze liners, elevator cars, railroad car interiors and truck panels. *United States Plywood Corp.*

For free copy insert No. 23 on postcard, p. 117.

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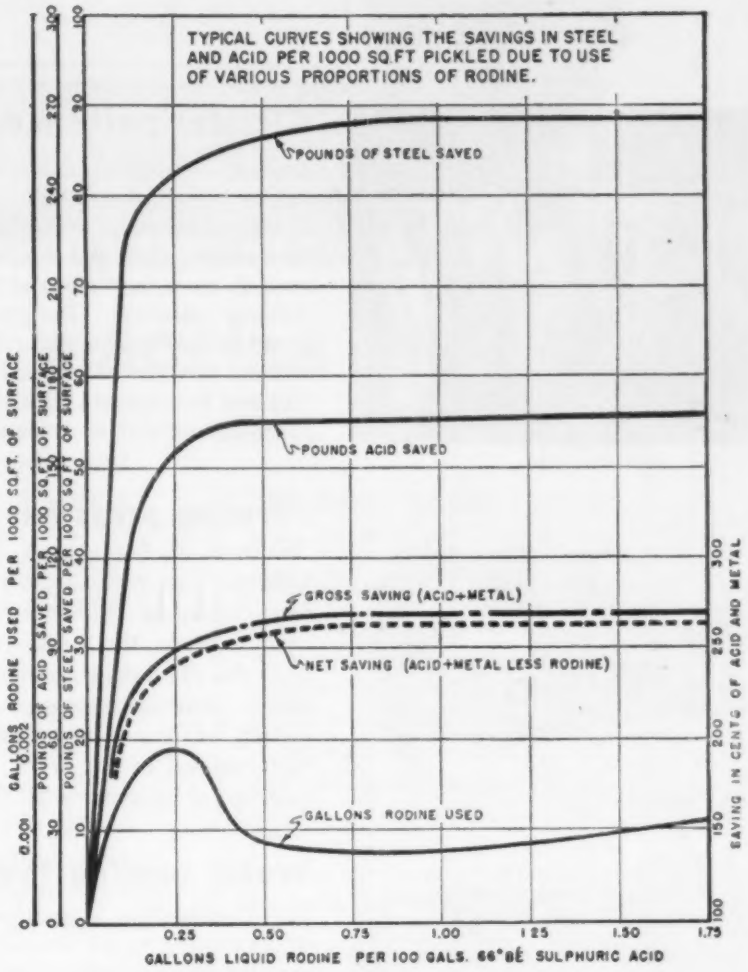
Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH "RODINE"®

A. SAVINGS POSSIBLE WITH "RODINE"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GALLONS RODINE USED PER 1000 SQ.FT. OF SURFACE
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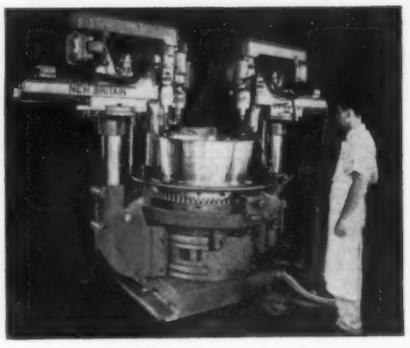
NEW equipment

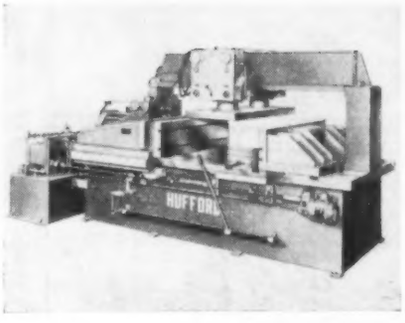
New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 117 or 118.



Circular pattern drilling aids jet engine industry

Drilling assembly holes in the flanges of shrouds, vane support rings and exhaust cones of jets can be accurate, fast, and simple in operation on a new circular pattern drilling machine. Designed for great flexibility, the machine drills, without the use of expensive drill jigs and fixtures and with standard indexing, regular or irregular hole spacings of 4 to 100 indexes in circles up to 48 in. diam. Maximum hole diam is ½ in. in steel. Furnished with 1 to 4 spindles, it can drill four holes at once, or can be set up to drill, ream and tap, or to drill, ream and countersink successively at one setup of the part. *New Britain Machine Co.*

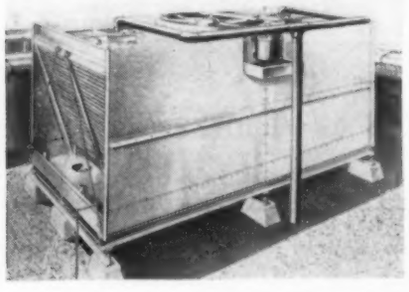
For more data insert No. 24 on postcard, p. 117.



Forming press has vertical hold-down cylinders

The new Hufford metal forming bulldozer has vertical die pressure plate clamping cylinders to positively secure the pressure plate upon the die during forming. Cylinders instantly release upon completion of the operation allowing fast removal of the work and reloading for another cycle. To effect the vertical clamping, two 25-ton cylinders are mounted on a rolling assembly that may be positioned anywhere along the bulldozer bed. Each cylinder is independently controlled. Pressure may be varied by reducing valves. Bulldozer illustrated is rated at 150 tons. *Hufford Machine Works, Inc.*

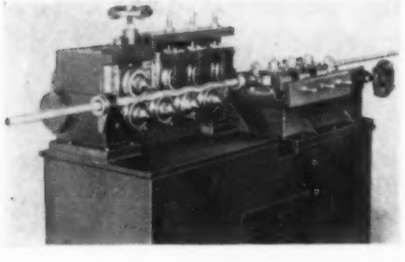
For more data insert No. 25 on postcard, p. 117.



Water cooling tower has medium capacities

The Double-Flow Aquatower is a water cooling tower for use wherever intermediate capacities of cold water are required and wherever air conditioning and refrigeration are used. The tower incorporates the double-flow principle—one fan utilizing air from two completely open sides. Pumping head and required fan horsepower are low for given capacity and design performance. Its height is low, detracting little or nothing from the appearance of buildings. Seven standard sizes start with a 50-ton unit. It is available in all steel or wood. *Marley Co., Inc.*

For more data insert No. 26 on postcard, p. 117.



Tubing and bar stock handled on straightener

Thin-walled tubing 1 in. OD and solid bar stock to ½ in. diam are accurately straightened on a new Shuster tube straightener, a two-way geared roll machine. Power driven feed rolls advance the tube through two sets of rolls, eight rolls to a plane. Tube does not rotate during passage, thus eliminating stock damage. Rolls can be supplied for square, hexagon and round stock tubing. *Mettler Machine Tool, Inc.*

For more data insert No. 27 on postcard, p. 117.

That goes for machine tools, too!

Even when machining at high speeds and feeds, Antisep All-Purpose Base solutions remove heat so swiftly that smoke has no chance to get started. Parts come off cool. Cutting tools last longer. Operators are better satisfied.

You can dilute Antisep A. P. Base heavily —as much as 1 part to 30 of water—and use it for general machine work as well as for automatics. Latest case-study booklet gives you scores of examples of Antisep's great cooling ability, safety, finish, and speed. Get a copy of this informative book without cost to you, from E. F. Houghton & Co., Philadelphia 33, Pa.

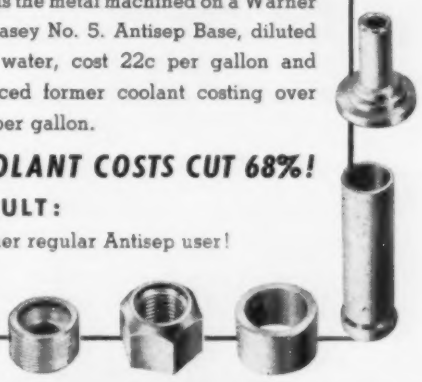
"NO MORE 'SMOKE SCREEN' ON OUR NUT-TAPPING OPERATIONS"...

A New England tool company reports that switching to Antisep gave them the top-quality finish demanded in their production of Diesel connecting rod nuts ... and much cleaner work. SAE 4140 steel is the metal machined on a Warner & Swasey No. 5. Antisep Base, diluted with water, cost 22c per gallon and replaced former coolant costing over 70c per gallon.

COOLANT COSTS CUT 68%!

RESULT:

another regular Antisep user!



ANTISEP

ALL-PURPOSE BASE

HANDLES 90% OF YOUR METAL-CUTTING OPERATIONS

E. F. HOUGHTON & CO.

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Ready to give you on-the-job service ...

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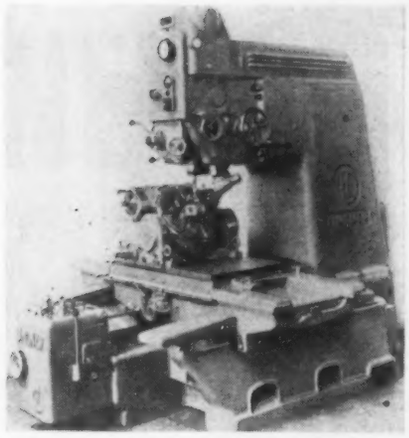
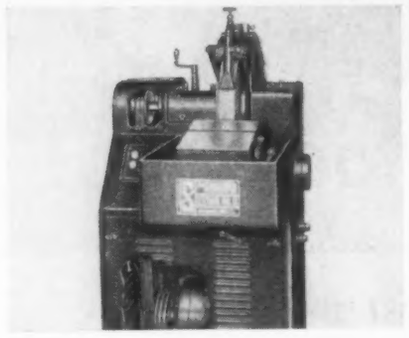


Measuring system assures accurate settings

Table settings accurate to ±0.00032 in. with maximum error between two bore holes held within ±0.0004 in. are provided by a direct-reading micro-optical measuring system built into the German-made Lindner jig borer. A fine helical line, diamond-inscribed on mirror-finish cylinders, provides the basis for optical reading of the fine adjustments of longitudinal and transverse movements. Rotatable cylinders enable intermediate measurements from thread to thread to be set on an annular scale to ±0.00004 in. and read through the microscope. The borer is equally adaptable to precision boring of bulky workpieces or heavy roughing operations without affecting the machine's accuracy of adjustment. Infinitely variable spindle speeds range from 50 to 1900 rpm in Model 15; 70 to 2000 rpm in the Model 14. *Kurt Orban Co., Inc.*

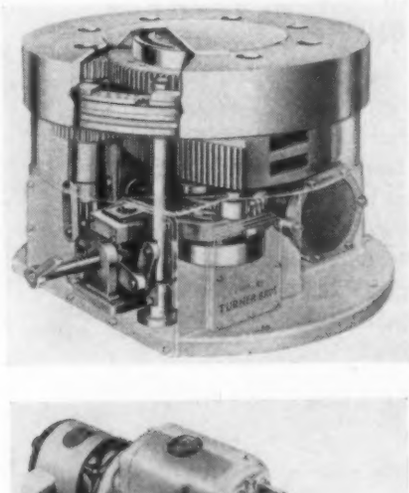
For more data insert No. 28 on postcard, p. 117.



Wet tool grinder delivers precision ground tools

Suited for hogging or snag grinding of carbide tool shanks, a redesigned straight wheel tool grinder is available in 14, 16, 18 and 20-in. sizes. The machine has large, well proportioned face with heavy spindle assembly. A 10x10-in. tilting table has renewable reversible table top wear plates. Copious coolant supply is delivered on the wheel and work, without spray or splash, through adjustable nozzle and hand valve. A 2-step speed on the V-belt drive with safety interlock prevents over-speeding of the grinding wheel. Start-stop pushbutton station is convenient to operator's working position. *Standard Electrical Tool Co.*

For more data insert No. 29 on postcard, p. 117.



Heavy loads indexed in record time

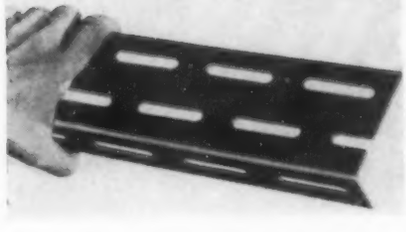
With a new mechanical indexing table, heavy loads are said to be moved from station to station within 3/5 sec indexing time. Every cycle of movement is controlled by the uniform gear tooth area of a master sector gear. A set of cams controlling the gear directly governs the acceleration and deceleration of the table in order to eliminate abrupt starting, stopping, or catapulting action. One horsepower operates a 24-in. unit with an 800-lb work load on the table top. Standard units are available with 2 to 26 stations, in any equal division of 360°. One table top revolves in its entirety as a single unit; another consists of a revolving outside indexing section and a stationary center section. *Turner Bros., Inc.*

For more data insert No. 30 on postcard, p. 117.

Drill unit built for high production work

The Delta drill unit is designed for heavy duty drilling, reaming, tapping, centering, chamfering, spot facing. Its air powered hydraulic circuit derives its thrust from the plant compressed air supply; its control from a sealed hydraulic system. Spindle is driven by an electric motor either directly through a gear train, or by V belts. The unit may be mounted in any position; takes up to 5/8 in. drill in steel. *Delta Power Tool Div., Rockwell Mfg. Co.*

For more data insert No. 31 on postcard, p. 117.



Slotted steel angle for industrial fabrication

Lengthwise rows of slots in a galvanized steel angle permit rapid assembly by bolting, of motor and machinery mounts, shelving, bins, scaffolding and other plant equipment. A hacksaw and a wrench are the only tools needed for assembly. Equipment can be built, altered or dismantled in a matter of minutes. The Dexangle is 10 ft long, 3x1.5 x0.080 in. *Acme Steel Co.*

For more data insert No. 32 on postcard, p. 117.

Plastic safety lenses

Made in new air-conditioned room where the lenses are scientifically baked in glass molds, plastic lenses, half the weight of their glass counterpart and said to be extraordinarily resistant to breakage, are designed to protect industrial workers. Eye saving lenses are optically perfect, clear as crystal and exceptionally tough. *American Optical Co.*

For more data insert No. 33 on postcard, p. 117.

Corrugated box

Reduced packaging costs without sacrificing protection of product is claimed for a sturdy, die-cut, one-piece corrugated box. Name, model and quantity are prominently displayed on the ends of the boxes for instant identification. Design makes setup simple. Inspection of merchandise is made easy and convenient. *Hinde & Dauch Paper Co.*

For more data insert No. 34 on postcard, p. 117.

Steel roadway

Diamond-shaped open mesh steel grating is being offered to industrial plants for loading area surfacing. Filled in with sand and saturated with asphalt road oiler as a binder, the steel surfacing is said to withstand the heaviest tractors, lift trucks and trucks, with virtually no maintenance costs or delays. *Irving Subway Grating Co.*

For more data insert No. 35 on postcard, p. 117.

Carbide tools

A line of standard carbide tipped tools for turning, boring, facing and threading are now stocked with Carboloy and Kennametal and other leading makes of carbides. Users of Super tools may avail themselves of the brand of carbide they prefer. *Super Tool Co.*

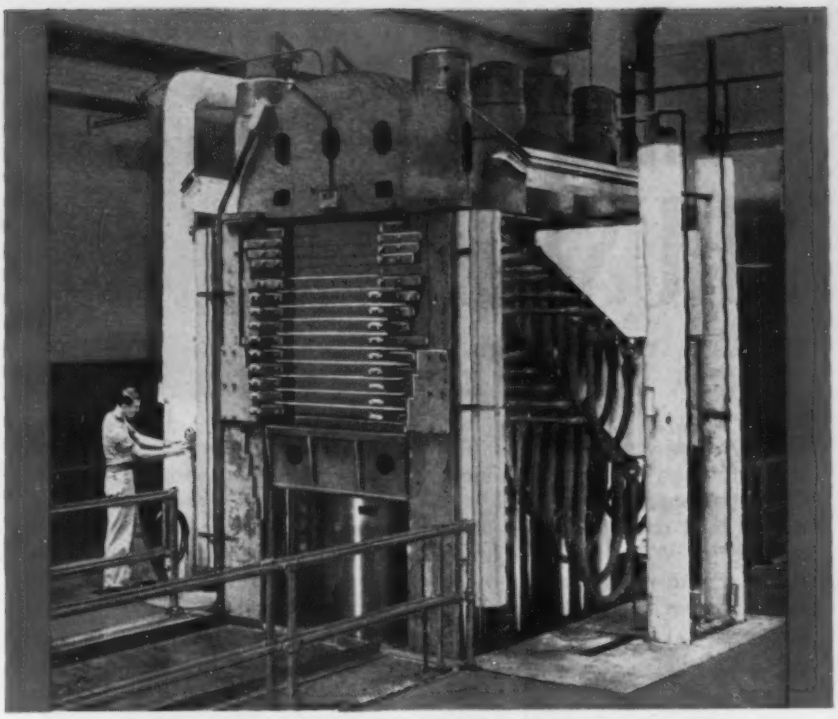
For more data insert No. 36 on postcard, p. 117.

Leather hand pad

Safti-Mitt leather handpads offer maximum protection and comfort. Adjustable to any size, the tie string keeps pad on and makes removal easy. Made of heavy genuine horsehide for long wear. *General Scientific Equipment Co.*

For more data insert No. 37 on postcard, p. 117.

Turn Page



NATIONAL PLASTIC thermo-sets Plastic Laminates with 3500-ton

FARQUHAR HYDRAULIC PRESS

The National Plastic Products Company, of Odenton, Maryland, required a hydraulic press for use in the thermo-setting of their NEVAMAR Plastic Laminates . . . a press that would be able to mold this material to very close tolerances.

Farquhar engineers supplied the answer with this built-to-specifications Hydraulic Press. The complete, self-contained hydraulic pumping unit has a capacity of 3500 tons. Each of the 15 hot plates has a clear working area of 50″ x 100″. Total working stroke: 49″.

The efficient Farquhar hydraulic circuit operates with a minimum number of valves —thus reducing maintenance cost considerably.

Its production problem solved, National Plastic is now successfully turning out Plastic Laminates to their exacting requirements.

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in heavy production. Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve whatever production problem you may have. Give them a call.

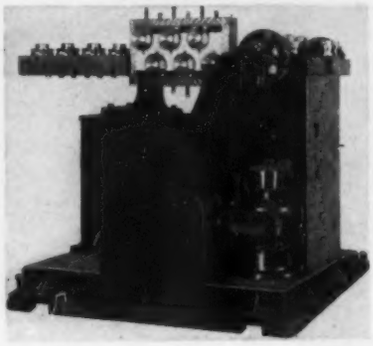
Send for Free Catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industry. Write to: A. B. FARQUHAR CO., *Hydraulic Press Division*, 1503 Duke St., York, Pa.

GET THE DETAILS on how our Deferred Payment Plan helps you pay for your Farquhar Hydraulic Press out of the savings it produces!

Farquhar
HYDRAULIC PRESSES
for Bending • Forming • Forcing • Straightening • Assembling • Drawing
Extruding • Joggling • Forging • and other Metal-working Operations

for tough, hard-to-start coiled rod stock

THE NEW
SHUSTER
FEED STARTER



This husky new Shuster Feed Starter eliminates fatigue accidents and stock damage caused by ordinary methods of starting heavy coil stock. Once the operator has brought the rod end in contact with the motor driven feed rolls, the entire unwinding and straightening of the coil is automatic. When the straightened stock reaches the pulling device on the next machine (header, press, etc.), the feed rolls are backed off, letting that machine pull the rod through the straightening rolls.

Feed rolls have two grooves to accommodate different diameters of wire up to 5/8", or can be supplied for square stock. Rate of speed: 68" per minute. The Shuster Feed Starter is also available without roll straighteners where production line machines are already straightener-equipped. Write us for complete details.

METTLER MACHINE TOOL, INC.
132E Lawrence Street New Haven, Conn.
Representatives in all principal cities and in foreign countries.

Weldit MEANS FAST ACTION AND ECONOMY

"FOR THE MAN WHO CARRIES THE TORCH"

The Weldit Model W-46 Welding Torch with the built-in automatic gas saver will give you an average gas saving per operator of $4.80 per day and will increase your production up to 148%.

MODEL W-46

WRITE FOR CIRCULAR NO. 3

The Weldit Weldimatic Torch eliminates idle flame danger. It is rugged, speedy, light, compact and safe.

The control lever of the Weldit Weldimatic Torch automatically shuts off welding flame when the operator loosens his grip on the handle. Saves fuel between welds.

991 OAKMAN BLVD. Weldit INC. SINCE 1918 DETROIT 6, MICH.

Canadian Distributor—ALLOY METAL SALES—881 Bay St., Toronto 5, Ont., Canada

—New Equipment—

Continued

Noise-stop baffles

Fiberglas noise-stop acoustical baffles are designed to reduce loudness of factory and shop noises. Easily and economically installed, they consist of a rigid panel of Fiberglas insulation, measuring 24x48 in. x 1½ in. thick, completely enclosed in a printed plastic film. The baffles are hung from wires strung horizontally at the desired height. They are lightweight, noncombustible, and easily maintained. *Owens-Corning Fiberglas Corp.*

For more data insert No. 38 on postcard, p. 117.

Aluminum treatment

Superior corrosion resistance and perfect organic coating adherence are claimed for Starcote, a new conversion treatment for aluminum and its alloys. Inexpensive and easy to use, the Starcote bath is maintained by a simple titration. Work may be handled in iron containers or racked. The material may be applied by dipping or by a conventional alkaline washing machine on a production line basis. *Silver Star Chemical Corp.*

For more data insert No. 39 on postcard, p. 117.

Flexible grinding wheel

With a new reinforced, flexible, hub-type grinding wheel known as the Norton BFR, an operator can rough grind, finish grind, and notch. Designed for use on right angle or sander type portable grinders, the wheel is made of carded web material impregnated with abrasive grain. It is light, possesses unusual strength, is sufficiently flexible to permit blending of contours, and does a good polishing job. *Norton Co.*

For more data insert No. 40 on postcard, p. 117.

Static balancer

The new Speedi-Balancer brings quickly into balance, grinding, polishing or buffing wheels on lathes. Wheels can be removed and replaced without adding or removing weights, by marking them with the setting of the balancing disks, then setting the Speedi-Balancer according to the marking. Balancers fit arbor sizes ½ to ⅞ in. and 1 to 1¼ in. *Anderson Bros. Mfg. Co.*

For more data insert No. 41 on postcard, p. 117.

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want better taper?

Torrington Swaging Machines taper both tubular and solid work quickly, accurately and economically. Delivering 4000 hammer blows a minute, the swager gives the metal toughness and resiliency . . . utilizes all the stock.

Our booklet, "The Torrington Swaging Machine," describes the art of swaging and illustrates the complete line of Torrington Swagers. Write for your free copy . . . today!

THE TORRINGTON COMPANY
Swager Department
555 Field Street • Torrington, Conn.

—New Equipment—

Continued

Blackening bath

Nu-Black is a two-bath method for blackening all the ferrous alloys, malleable and cast irons and carbon steels. It is effective over a wide temperature range creating a black surface of uniform density without dimensional changes in the piece so blackened. Operational efficiency is attributed to the process of Activanium Blending which involves the use of several energizing agents in Nu-Black. Energizers are chosen and blended with end application in mind. *Swift Industrial Chemical Co.*

For more data insert No. 42 on postcard, p. 117.

Spray booth coating

Vinyl-type paint spray booth coating material called Vincote has been developed for use on the side walls of water-wash and dry paint spray booths. The material possesses rapid drying properties and when sprayed on a booth wall forms a tough plastic film with exceptionally high tensile strength. Vincote is impervious to paint, enamel, lacquer, and water. When paint over-spray has built up to a point where its removal is indicated, the coating and all oversprayed paint is merely peeled off in large, easily removed sheets. *Detrex Corp.*

For more data insert No. 43 on postcard, p. 117.

Vapor level control

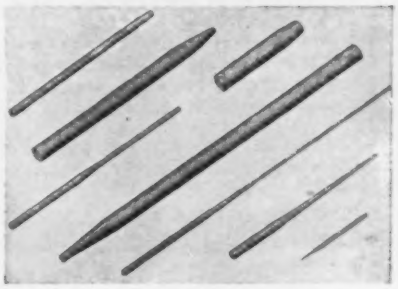
Thermostatic controls enable a hot vapor degreaser to operate at highest efficiency while its heating elements are protected from destructive overheating. Two Thermoswitch units maintain the vapor level at a safe height within the tank and prevent the heater elements from burning out. Greasecoated or grimy materials, suspended in the degreasing tank, are effectively cleaned by the hot solvent vapors generated by heating the reservoir of solvent at the bottom of the tank. The hot vapor, condensing on the surface of the material, washes off the grease or grime that then collects as sludge at the bottom of the tank. *Fenwal, Inc.*

For more data insert No. 44 on postcard, p. 117.

YOU SAVE

on parts made to your specifications by

TORRINGTON



You save time and money when you rely on our high productive capacity and special equipment to turn out precision parts to your order.

Typical are surgical and dental instruments, pen and pencil barrels, soldering iron cases, etc. Medium wall tubing up to 2½" O.D. and solid steel .015" to ⅝" diameter handled.

We are also set up to make such parts as special rollers, shafts, studs, dowel pins, special needles, instrument shafts and pivots, screw driver and ice pick blades, knurled mandrels and spindles, etc.

Send your prints and specifications today for prompt quotation.

THE TORRINGTON COMPANY
Specialty Department
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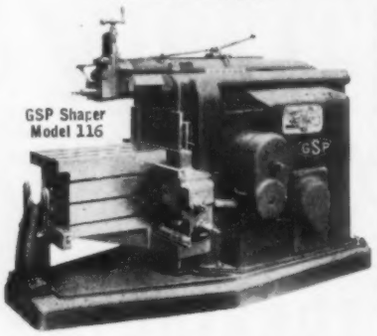
Makers of
TORRINGTON NEEDLE BEARINGS

Now Available—
IMPORTED
MACHINE TOOLS
EXCELLENT DELIVERY
ON MOST MODELS



These are superior machine tools, built to the highest standards of American and European workmanship. Perrish Steel Products is supplying such "hard-to-get" machines every day to many large U. S. Manufacturers, with great savings in delivery time and cost. We invite your inquiry on *any* machine tool, as many we are able to supply are not listed here.

EXCLUSIVE AGENTS FOR

GAMBIN—Precision Universal Milling Machines.
GSP—Vertical, Radial Drills; Universal Radial-Arm Drilling Machines; Portable-Universal Radial Drill; Shapers; Slotting Machines; Universal Gear Hobbers; Double Housing Planers; Girder Radial Drills; Openside Planing or Plano-Milling Machines; Semi-Jig Boring Tables.
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SPM—Automatic-Cycle Multitool Lathes; Hand or Automatic Drilling Machines; Automatic Tapping Units; Automatic Drilling Units.
ETS. SCULFORT FOCKEDAY VAUTIER—High-Speed Lathes.
CORNAC—Boring Machines.
LINE JOST—Drilling, Radial Drilling Machines; Planing Machines.
MOPCO—Grinding Machines.
NOEL ERNAULT—Semi-Automatic Turret Lathes.
S.F.A.C.—Saw-Blade Sharpeners; Cold-Sawing Machines.
SOMUA—Engine, Sliding & Screw Cutting, Production, Copying Lathes; Milling Machines.
BECHET—Automatic Free-Cutting Lathes.
OTALU—Universal Sawing, Filing, Grinding, Punching & Riveting Machines; Flexible-Shaft Machines.
SIOME—Universal Machines (Combination Lathe, Milling and Boring Machine).
WERMELINGER—Sliding and Surfacing Lathe.
PRECIS—Drilling, Drilling & Tapping Machines . . . *and many others*.

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Technical Briefs

Strip Mill:

Control system simplifies motor design in new 66-in., 4-stand mill.

A new recently developed magnetic amplified system will be used to control a new 66-in., 4-stand tandem cold-reduction mill being built for Pittsburgh Steel Co.

The Megamp system, developed by Westinghouse, will furnish excitation and regulate the voltage of generators supplying the mill and reel motors. Voltages of separate generators supplying the individual stand drive motors must be proportioned accurately during threading, acceleration, running, and deceleration, to avoid looping or breaking the strip between stands and to assure the smallest possible amount of off-gauge strip.

The mill will be the first installation with twin-motor drives on all stands. These motors will be connected through off-setting gears to the upper and lower mill work rolls so that the rolls are driven independently.

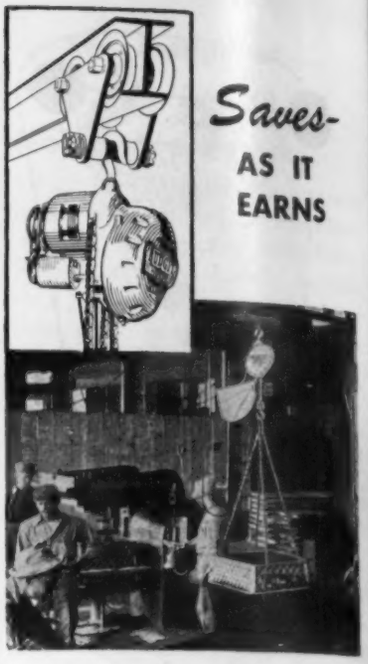
With a twin-motor drive, off-setting gears are necessary since the two motors cannot be located to couple directly to the small diameter work rolls.

Since each succeeding stand must run faster as the strip is rolled thinner, previous mills required different motor designs and speeds for each stand.

By making the off-setting gears of different ratios, the motors can operate at the same speed and hence be of duplicate design.

On the new mill, six duplicate 2250-hp motors will be used for the three 4500 hp twin-drives on stands Nos. 2, 3, and 4. Also, selection of the 200 to 450 rpm speed range for these motors, allows extensive interchangeability of the off-setting gear parts.

The new mill is scheduled for delivery to Pittsburgh Steel Co.'s Allenport, Pa., mill early in 1953, with regular operation scheduled for mid-1953.



Saves-
AS IT
EARNS

The 'Budgit' Electric Hoist has saving ways important to operators and management. Electricity does the lifting. No torn ligaments. No lost time due to injuries.

The 'Budgit' works fast. The smallest size can lift 250 lbs. nearly half a foot a second. All it takes is a gentle pull on the control cord. Load and motor brakes act quickly, simultaneously—either one alone can hold the load safely. Anti-friction bearings and precision gears likewise contribute to fast, smooth performance.

The 'Budgit' is a meter-miser — uses only a few cents' worth of electricity a day. It is a complete, portable hoist — no installation cost. Merely hang up, plug in, and the 'Budgit' saves as it works. And, your maintenance man will see little of this hoist during its long, dependable service life.

Let the 'Budgit' boost your defense production—economically. Capacities: 250 to 4,000 lbs. Prices start at $119. Write for Bulletin No. 391.

'BUDGIT' CONDUCTOR CORD TROLLEYS
keep flexible conductor cord away up out of the way while carrying electricity to monorail hoists. Roll smoothly around curves, past switches.

'Budgit'®
HOISTS
MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN
Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

Precision Quality!

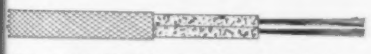
Immediate Shipment

GORDON THERMOCOUPLE EXTENSION LEAD WIRE

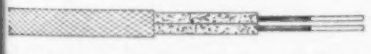
The precision quality of Gordon Thermocouple Extension Lead Wire is the result of continued experience since 1915 in careful selection and inspection that meets rigid insulation requirements and Bureau of Standards specifications.

Gordon's Chicago and Cleveland plants carry complete stocks of Thermocouple Extension Lead Wire for practically every application. (See illustrations below.) These are good reasons why your order gets immediate delivery of a QUALITY product. ORDER NOW! No delays. Prices available on request.

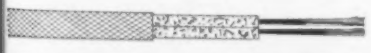
CHROMEL-ALUMEL, Cat. No. 1231(3-A), 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.



FOR PLATINUM THERMOCOUPLES, Cat. No. 1225, 16 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.



CHROMEL-ALUMEL, Cat. No. 1234, 14 ga., SOLID-DUPLEX, each wire enamel, felted asbestos, Asbestos-yarn braid overall.



IRON-CONSTANTAN, Cat. No. 1236-C, 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

COPPER-CONSTANTAN, Cat. No. 1235-A, 14 ga., SOLID-DUPLEX, each wire cotton, rubber, weatherproof braid, lead sheath overall.

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—Technical Briefs—

Surface Standards:

ASA standards for machined surfaces aid designers, inspectors.

A guide to designers, inspectors, and specification writers in designating the type of machined surface desired on industrial products has been approved by the American Standards Assn. Title is the **American Standard for Physical Specimens of Surface Roughness and Lay, B46. 2-1952.**

Two types of physical specimens are described. One is for general purpose blocks—representing typical machined flat surfaces. The second is for precision checking of surface roughness measuring instruments.

For general purpose blocks the standard lists various types of finishes, a range of roughness heights in microinches, lay, and roughness width in inches.

Six classes of surfaces are included: honed, lapped or polished; ground with periphery of wheel; ground with flat side of wheel; shaped or turned; side-milled, end-milled, or profiled; and milled with periphery of cutter.

Altogether, nine roughness height values are given ranging from 2 to 500 microinches. For each range of roughness height values, a tolerance is given. For shaped or turned surfaces with roughness heights ranging from 32 to 500 microinches, the tolerance on the specimens is plus 15 and minus 20 pct.

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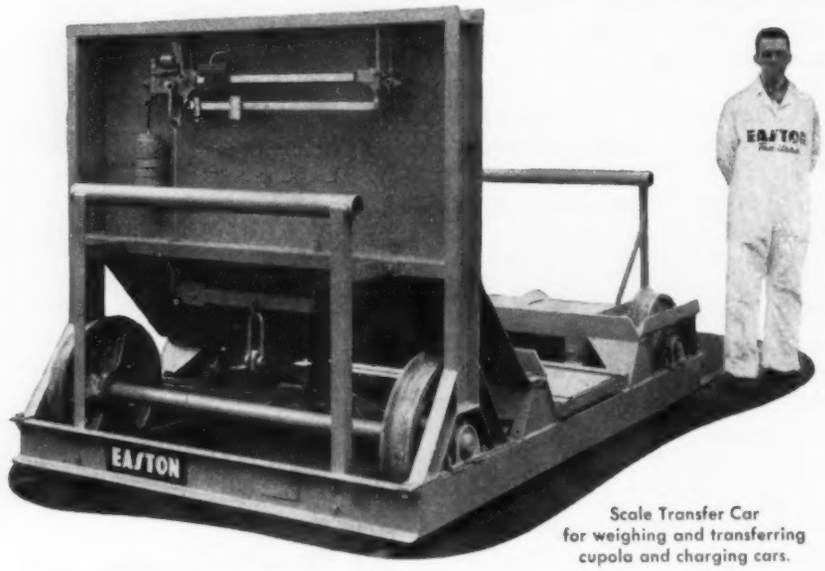

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—Technical Briefs—

Instrumentation:

Super-recording gadget reports at 400 different plant conditions.

Pinpoint control of plant operations will become a reality with use of a new annunciator which can record as many as 400 different conditions within the plant.

The machine, recently installed in the Johnsonville, Tenn., electric power plant of the Tennessee Valley Authority, was described at a recent meeting of the Instrument Society of America in New York. The machine is suitable for use in steel plants and other large industrial installations.

The device will report, record and print when and where some 400 different conditions occurred, and when the situation was restored to normal. It automatically shows normal operations as well as any deviation from the normal in transformers, boilers, turbines, circuit breakers and other auxiliary equipment. The unit was built by Taller & Cooper, Inc., of Brooklyn, N. Y.

A memory device permits it to store up to 26 different reports on occurrences which can happen as close as 10/1,000ths of a second apart. It will then feed this information to the recorder and printer.

"Hasn't she got the prettiest eyes?"

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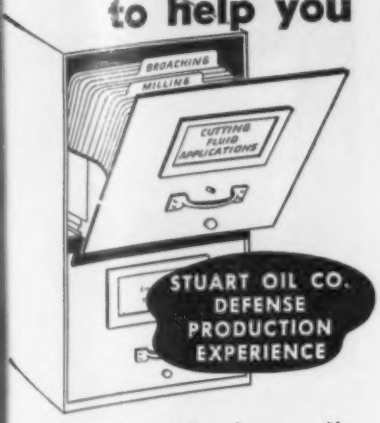

DEFENSE production spells tougher materials and new materials such as high temperature alloys and super stainless steels. Such metals and the tolerances and finishes required by Armed Services specifications bring new problems to plants experienced in civilian production.

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—Technical Briefs—

Electrodeposition:

Pure coatings of unusual metals are sought in studies at NBS.

Demand for pure electrodeposited coatings of molybdenum, tungsten, titanium, zirconium, beryllium and aluminum is the basis for a portion of a study on electrodeposition being conducted by the National Bureau of Standards.

If these metals can be electrodeposited in a pure form with good physical properties, such coatings will find important industrial and military uses.

It is improbable that these metals can be deposited from aqueous solutions, even under very high temperatures and pressures. Studies are being made on nonaqueous baths. In one, metallic salts are dissolved in organic solvents to yield conducting solution. The second is the fused salt bath, usually operated at relatively high temperatures.

As an example of the possibilities in this field, a recently published report describes a new type of organic bath for depositing aluminum.

The bath consists of aluminum chloride dissolved in ordinary ether and contains also lithium or aluminum hydride. The presence of the hydride leads to production of dense, ductile deposits of aluminum, which will probably find use in plating other metals with aluminum and in electroforming wave guides for radio communication.

Research in progress on molybdenum deposition shows that fairly dense pure deposits of molybdenum may be obtained from a fused bath operated at 600°C.

Sparks Cut Hard Alloys

Jet turbine blades, thread and rifle gages and other parts made from hard alloys are being machined with electric spark cutting devices. The machines, recently discussed at a meeting of the American Institute of Electrical Engineers, permit rapid, accurate cutting of hardened steel, tungsten carbides and vitalium.

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Mica:

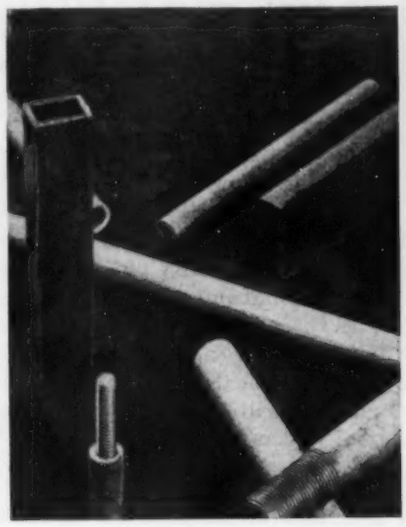
Thin sheets and roll mica now available . . . May cut imports.

Mica took the limelight in the news recently with announcement of a method of producing continuous thin, coherent sheets of mica by an adaptation of conventional papermaking techniques.

The new method will free this country of dependence on foreign sources of mica and will make exploitation of Western Hemisphere mica deposits worthwhile costwise.

Continuous, thin sheets and mica by the roll are being produced by the Samica Corp., of Vermont, and General Electric Co., of Pittsfield, Mass.

Secret of the method is the manner of treating minute mica flakes. A force is generated which holds the tiny particles together. The result is mica in sheet or roll form. Laminates, tapes and molded shapes for electrical equipment are seen as a possibility in the near future.



Rods and tubes, left, are built up from mica paper. The built-up mica product can be machined, punched, tapped and threaded. At right, GE's Micamat is shown emerging from a machine as a continuous sheet. Papermaking techniques and a method of treating minute mica flakes so that tiny particles cling together are used.

Foreign mica is usually split into thin sheets by hand labor. Mica desposits in this hemisphere could not be used because of the high cost of splitting the sheets. At present nearly all mica is imported from India and Madagascar.

The mica sheets can be impregnated with resins and bonded to paper, glass and cloth. GE's Micamat is produced in gages from 0.002 to 0.006 in. and is presently being made in a pilot plant operation. Commercial production is planned early in 1952.

The present development at Samica Corp. is based on experiments made by Jacques Bardet in 1939 and was first used on a laboratory scale in 1943.

Channels and commutator rings are built up from mica paper.

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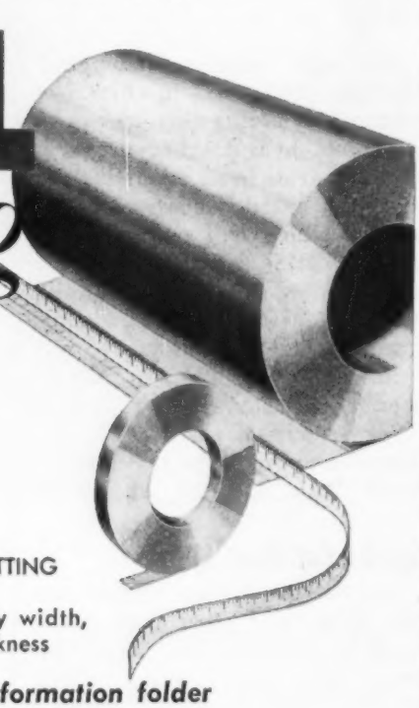

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—Technical Briefs—

Isotopes:

Medical research gets lion's share of isotopes from Oak Ridge.

More than 22,300 shipments of radioactive isotopes have been made from Oak Ridge, Tenn., through Nov. 1951, according to a report recently published by the Atomic Energy Commission. More than 1700 shipments of stable isotopes were made in the same period.

Shipments for medical therapy and animal physiology research accounted for more than 15,000 of the shipments. Balance of the shipments was distributed among laboratories studying physics, chemistry, plant physiology, industrial and general research, and bacteriology.

Shipments of the radioactive isotopes are broken down as follows: Iodine 131, 8359; phosphorous 32, 6582; carbon 14, 1047; sodium 24, 868; sulfur 35, 478; gold 198 and 199, 539; calcium 45, 343; iron 55 and 59, 262; cobalt 60, 441; potassium 42, 382; strontium 89 and 90, 157; others, 2889.

Of the stable isotopes, deuterium oxide and deuterium account for 971 shipments. Balance of the shipments were of boron 10 and 11, helium, oxygen 18, electromagnetic concentrated isotopes and argon 38.

California, Illinois, Maryland, Massachusetts, New York, Ohio and Pennsylvania received the largest portion of the shipments.

Metal Stitching:

Jeep gas-tank straps are assembled at high speed by stitching.

Metal stitching is cutting assembly time of anti-squeak felt to steel strap in the production of Jeep gas-tank straps by two-thirds, at lower cost per unit, at the Willys-Overland plant at Toledo, O. The method has helped boost production of straps to 300 units per hour.

Five stitches anchor the 1/16 x 1-in. strip of asphalt-saturated felt to the 0.0475 in. gage steel strap. Stitches are formed by Acme-Morrison metal stitchers from 18-gage tinned or galvanized wire.

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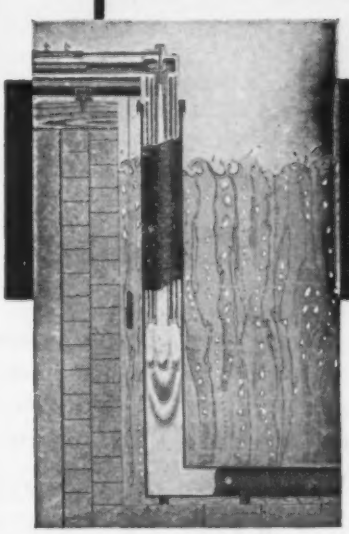
Exposed view of Submerged Combustion Burner installed directly into pickling vat. Automatically gas fired. Thermostatically controlled to keep acid at correct pickling temperature.

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GAS BURNERS
FOR FASTER, CLEANER LOWER COST
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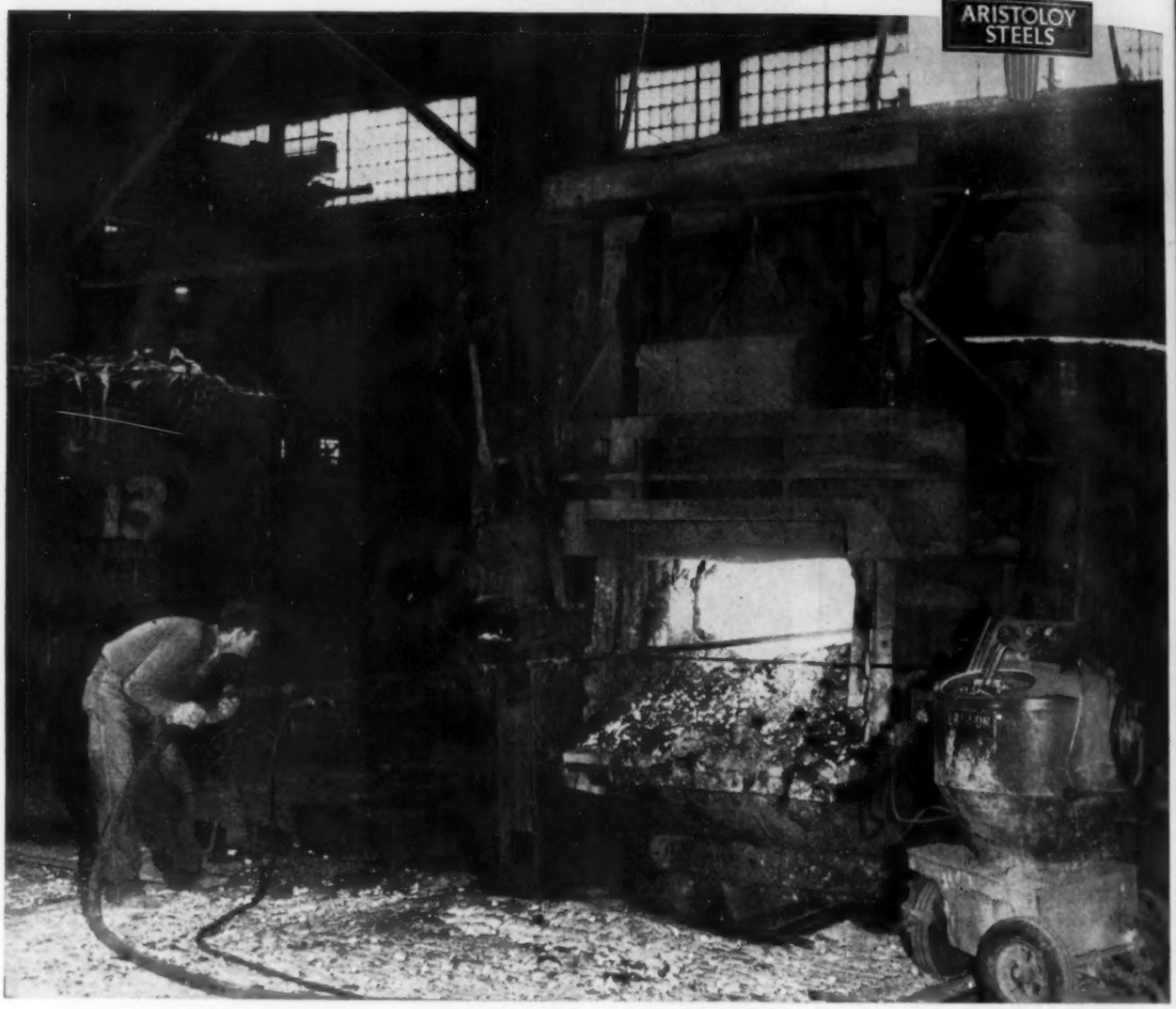
In producing Aristoloy Steels, Copperweld Steel Company employs up-to-date methods, including an advanced refractory practice. After every heat, BRI Guns are used to restore furnace linings with a light application of Gundol.

ARISTOLOY STEELS



BRI Guns + Gundol = 550 heats per lining at Copperweld

THE record is convincing. In 1951, Copperweld's seven electric furnaces at Warren, Ohio, tapped over 13,000 heats, averaging above 40 tons. Two furnaces set new lining life records—each averaging better than 550 heats. Shop average was 397.5 heats.

In addition to this increase in over-all lining life, operations at Copperweld cite two further benefits from the use of BRI Guns and Gundol: Balanced lining life, with brick patching during campaigns practically eliminated, and maximum furnace availability. To meet critical mill schedules, furnaces have been held two or three days beyond normal relines.

BASIC FURNACE

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Copperweld Steel Company is one of many electric steel producers now using BRI Gun refractories. If you operate electric furnaces, large or small, you, too, will be interested in the economies possible with the BRI Gun and Gundol or Gunmix.

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Cast Scrap Grades Sink Under OPS Ceiling Prices

Some grades of cast iron scrap sell under OPS ceilings . . . In other cases seller absorbs freight charges . . . Many foundries out of the market . . . Poor business is the cause.

For the first time since scrap prices were frozen, Feb. 7, 1951, prices of some grades quoted in THE IRON AGE have fallen below ceilings. (See p. 142.)

In some instances high quality material is being billed as a secondary grade — a sure sign of weakness in the market. Some brokers are finding it necessary to pay the freight in order to move cast grades. Founders are becoming more choosey about quality and are shortening their supply lines. A number of large foundries were completely out of the market early this week.

Foundry Business Off — Main reason for the price declines in cast scrap is poor foundry business. Except for heavy castings, foundry business never did show the expected upsurge of defense business. Instead of improving, their business has been getting worse. New orders haven't matched production, backlogs have shrunk. In many areas foundries have had to cut their work week and are living off inventories, thus causing demand to sink.

In addition to disappointing defense business, foundry business has been hurt by cutbacks of their customers who make civilian goods. For example, founders who make soil pipe are being hit indirectly by restrictions on commercial construction. The same holds true for founders who sell automotive castings.

Steel Grades Improve—Also contributing to the cast decline is an improvement in the outlook for steelmaking grades of scrap. For the first time in many weeks the steel industry reflects guarded optimism on its scrap supply outlook. In all major steelmaking centers the pressure on open-hearth grades is just a bit easier.

U. S. Steel Corp., which had previously returned its five idle open-hearth furnaces in the Pittsburgh area to operation, this week started paying back the scrap it had borrowed from another company several weeks ago.

Steelmaking scrap is still in very short supply, but the industry is hopeful it can squeeze through the winter without losing production for lack of scrap. Admitting the brighter outlook, steelmakers caution that a long-term scrap shortage still exists.

Decontrol Pressure Rises—Peaceful settlement of the steel wage-price fracas would mean more pressure for decontrol of steel. Washington is in no mood to do much about lifting controls while the spectre of a strike threatens loss of production. But, after a wage-price settlement is reached, reluctant officials will find it hard to counter growing demands that they relax their grip on the steel market.

Demand for decontrol is based on a rapidly softening market for some steel products. Arguments are founded on official statements of defense officials that decontrol would come, product by product, at the earliest feasible moment. So far, agitation for total decontrol of steel is little louder than a whisper. Steel leaders won't raise their voices very high on this issue unless the market takes a sudden nose dive. They'll watch their order books; as open space shows up, they'll shout for relief.

Holding Fire—While steel people believe controls could be lifted right now on a number of steel products, they aren't too optimistic that this will happen while the wage case is pending. Also, they are not at all sure that there won't be a strike. Nothing has come out of the hearings before the steel panel of the Wage Stabilization Board to make them optimistic.

Producers feel that lifting restrictions on use of tinplate, cold-rolled sheets, mechanical tubing, some wire products, and conduit could be accomplished now—without hurting the defense effort. They believe this would increase sales of these items.

Steel executives aren't down-in-the-mouth about the outlook for steel demand. But, with new capacity coming in at a rate of about a million tons a month, they feel the return of a buyers' market can't be too far distant. At least several producers expect to have their salesmen beating the bushes in earnest in the third quarter.

How and When—One large producer believes the storm warnings are already up signaling a definitely easy market, with some exceptions, in the third quarter. Excepted from this category are structurals, heavy plates, and oil country goods.

Rather than completely lift controls on easy products, Washington might prefer to ease restrictions on use. This might be done by lifting the lid on auto output, for example. The Administration might favor such a move as a means of wriggling off the hook on charges that unemployment in Detroit has resulted from faulty planning of the defense production timetable.

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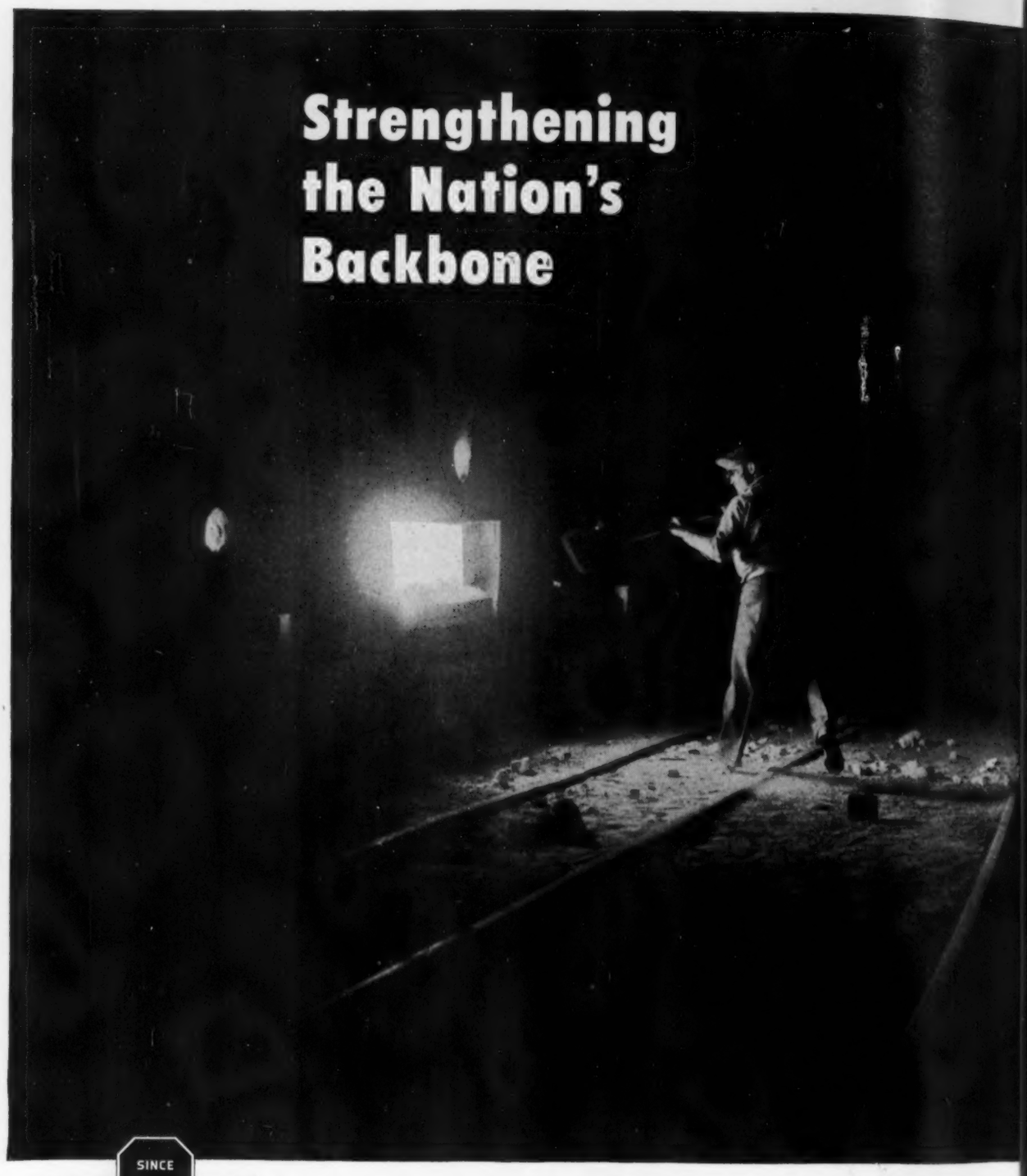

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Market Briefs

more copper — New action to spur the production of copper in the upper peninsula of Michigan is about to be taken by the federal government in a "guaranteed market" contract with the White Pines Mining Co. Defense Materials Procurement Agency has agreed to guarantee purchase of $28,665,000 worth of copper over a 10-year period if the metal cannot be marketed at profitable prices. The new contract is in addition to the Reconstruction Finance Corp. loan for mine development.

financing — Detroit Steel Corp. has filed a statement with the Securities & Exchange Commission seeking to register $25 million worth of first mortgage bonds and 600,000 shares of preferred stock at $25 par value. Nearly $14 million of the expected proceeds will be used for refinancing existing indebtedness and the remainder is to be applied against financing of the firm's $55 million expansion program. Nearly $20 million has already been expended or set aside for construction of new facilities, it was said.

good supply — Refractory production is now ample to meet future demands of steel and other expansion, according to National Production Authority and the refractories industry advisory committee. Certificates of necessity for $57 million of expansion have been granted since late 1950. Capacity of the industry will be increased an estimated 40 pct over 1948 when the present program is completed.

want more — Drop forgers are asking National Production Authority to permit inventory increases from 45 to 90 days for carbon and low-alloy steels, and to 120 days for high density and stainless. Present ceilings are claimed to be unsuitable for most of the industry. Federal help is also asked in getting more hot rolled carbon bars and billets.

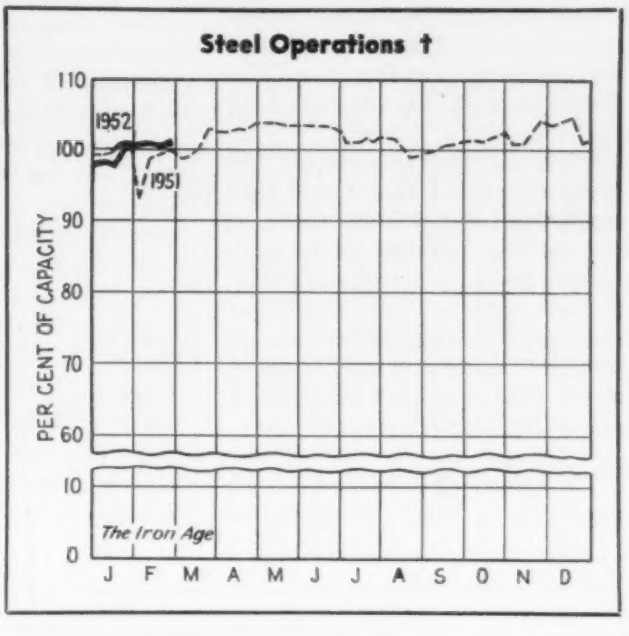
new loan — Barium Steel Corp. has arranged for a term loan from Pennsylvania Co. for Banking & Trusts of Philadelphia to repay borrowings from Reconstruction Finance Corp. Loan is secured by a $2.5 million mortgage on Barium's subsidiary, Central Iron & Steel Co., Harrisburg, Pa. It is for a term of 25 months and carries a 4 pct interest.

cutback — Crucible Steel Co. laid off 37 of its 250 employees this week at its Spring Works due to reduced orders for first quarter. Spring shipments this quarter will be 1100 tons, compared with a normal 1500 tons. The 1-week curtailment amounts to about 27 pct.

ask advance planning—Structural steel fabricators last week urged National Production Authority to institute advance planning to avoid anticipated unemployment in the industry in the last half of 1952. Spokesmen said orders are decreasing, and warned that the industry will be hard hit by mid-year without more business. (THE IRON AGE, Feb. 14, 1952, p. 85.)

makes oxygen—A semi-portable high purity oxygen generator developed by Joy Mfg. Co., Pittsburgh, is aimed at an extensive market in steel mills and metal fabricating plants. The machine will produce high purity oxygen at a cost of $12 to $24 per ton, 5¢ to 10¢ per 100 cu ft—a saving, according to Joy, of 60 to 85 pct before amortization as compared with purchased oxygen.

in Europe — U. S. defense contracts totaling between $500 and $600 million will be awarded to manufacturers by June 30, according to Defense Dept. plans. Idea is to use European capacity to help break defense production bottlenecks. At the same time, U. S. prime contractors are being urged to use European subcontractors where possible.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 10	102.0	101.5	99.0	100.0	102.0	104.0	100.5 *	103.0	100.0	104.0	89.0	77.5	93.6	100.0
Feb. 17	102.0	101.5	101.0	100.0	102.0	104.0	100.5	103.0	102.0	104.0	96.0	68.6	92.5	100.5

† Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Buy 30,000 Tons of British Lead

Delivery set for next 4 months at U.S. ceiling prices . . . Industry critical, claims shortage was caused by controls . . . Announce new aluminum production method—*By R. L. Hatschek.*

Governments of the U. S. and Great Britain have closed a deal whereby the U. S. is to receive 30,000 long tons of lead at ceiling prices during the next 4 months from the British Government. The metal will either replace 30,000 tons withdrawn last year to alleviate the then critical shortage or be diverted to industrial consumption if it is needed.

Industry Critical — Members of the lead producing industry took this occasion to make another blast against the government controls on lead and zinc. Andrew Fletcher, St. Joseph Lead Co. president, tagged it another encroachment of government on the functions of private industry. He called the supply-demand imbalance a result of government buying and took the opportunity to again suggest the decontrol of lead and zinc.

Other industry men backed Mr. Fletcher's stand that world lead supply and demand are balanced and pointed out that European's had an oversupply while the U. S. was struggling along in a short position. The claim was also made that bad timing was used in stockpiling when demand was high and not stockpiling when it was off.

Tin Dickering — Indonesian tin negotiations were scheduled for resumption this week but, at press time, there was no word of any new action. Talks were suspended last week at the request of the Indonesians who wanted time to contact their government about the U. S. insistance that $1.18 was the highest it would pay. It was reported earlier that the Indonesians were seeking a price of about $1.25 per lb.

Meanwhile, it was learned that the first part of a 20,000-ton shipment of tin for the U. S. left Liverpool over the weekend.

Study New Process—British Columbia Aluminum Co. is investigating a new aluminum production process at its $200,000 pilot plant in New Westminster, B. C. It uses a new type of "square" or long-wave electricity discovered by application of the same mathematical formula which resulted in the development of atomic fission. The first test bar was made last November but security held up the announcement.

Alfred Vang, president of the company, said the electricity was produced by a "magnaquanta converter," a process sought for 25 years, which puts out a current differing from both the usual alternating and direct current. No further details are available at present.

Magnesium Prices—Dow Chemical Co. has announced certain magnesium price revisions effective with new orders received after Feb. 17 and current orders scheduled for shipment after Mar. 31, 1952. Base prices for specification grade sheet in thicknesses of .072 in. and under were increased approximately 20 pct; bases of all ZK60A and O-1 alloy extruded products were boosted some 16 to 18 pct; and the mill standard size for .020 in. sheet is changed from 48 x 144 in. to 36 x 144 in.

Mercury Dipping — The latest drop in the mercury market has brought that metal down to $200 to $202, the lowest range in over a year and the first time that it has sold for $200 per flask since the price freeze. Further dips are a definite possibility.

Copper Stocks Drop — Refined copper stocks in the U. S. decreased 10,692 tons during the month of January, according to the Copper Institute. Refined production showed about a 2000-ton gain to 100,269 tons for the month but deliveries were at the highest point in 5 years totaling 130,430 tons for a daily average of 4207 tons. Primary and secondary crude copper production was 83,208 tons, off from 86,680 in December.

Imports Topple—Figures on total imports of copper, lead and zinc in 1951 tell an interesting story. According to American Bureau of Metal Statistics total imports, in all forms, of copper were 29.27 pct lower in 1951 than in 1950; of lead were 52.21 pct lower; and of zinc were 8.89 pct lower. Total copper imports in 1951 were 487,600 tons as compared to 689,389 tons in 1950; lead imports for the year were 248,793 tons against 520,614 for 1950; and zinc imports totaled 390,440 tons in 1951 compared to 428,525 tons for the previous year.

NONFERROUS METAL PRICES

	Feb. 13	Feb. 14	Feb. 15	Feb. 16	Feb. 18	Feb. 19
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

UNIVERSITY OF MICHIGAN LIBRARIES

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ¼ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2,284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. **Coiled Sheet:** 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. **Base:** 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape; Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1¼ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks		58½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex. 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$200 to $202
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33¾
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz., f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20¼
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17⅞
Red brass	20½	19⅝
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Maker's Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14¾
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New Zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10 —10½
Batteries, acid free	7 — 7¼

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100 —110
No. 1 pewter	80
No. 1 auto babbitt	60
Mixed common babbitt	16¼—16½
Solder joints	22 —23
Siphon tops	60
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stereo. dross	8¾— 9
Electro. dross	7½— 8

Breathe Easier on Steel Scrap Grades

But cast slips further, below ceilings . . . Openhearth scrap moves more freely . . . Some think that we're over the hump . . . Get tougher on scrap quality . . . U. S. Steel pays its debt.

While cast grades of scrap remain rooted in dispirited demand, movement of openhearth steel grades is reported freer. An optimistic feeling on openhearth supplies is being generated in all steelmaking centers. It is based on thinking that the steel and scrap industries are over the hump.

Mill stockpiles are improving and the spring thaw of scrap supply is just around the corner. Odds against a crippling blizzard shorten with every day.

Some mills are taking advantage of this "miraculous" easiness in supply to clamp down on quality of receipts. Even consumers in scrap-minus Pittsburgh are breathing easier and U. S. Steel Co. is paying back scrap it borrowed last month.

Softening steel demand is considered by some scrap men as a factor in that trouble-free feeling. But generally the steel scrap market remains tight and all the bona fide openhearth and blast furnace scrap that can be generated is being purchased.

Cast grades of scrap continue to skid. Numerous reports of below ceiling sales are circulating, achieved in one way or another. Not much of this material is moving and so many types of deals are being made that it is difficult to pin selling prices down.

In some areas, sales of cast below ceilings were confirmed. (See p. 142.)

Pittsburgh—For the first time in months, a note of mild optimism is creeping into the picture here. Some brokers and consumers are talking about a comparatively easy market within the next month barring a siege of paralyzing winter weather — and spring is not too far off. Cast and so-called electric furnace scrap continue soft. Openhearth grades are more available. Reports circulate here of (1) heavy influx of scrap into southern and southwestern collecting points, (2) greater optimism in New England, and (3) mills temporarily out of the market.

Chicago—Scrap remains generally in demand with only cast iron going begging, and there have been some evidences of some sort of below market sales of cast. Charging box cast is going best, some of this moving eastward.

Philadelphia — The cast market is beginning to crack. No under-ceiling sales have yet been reported but some material that would formerly have gone into cupola cast at $49 is now going into charging box cast at $47. Consumers will no longer reach into remote locations and pay higher freight. Auto wreckers are busy but their unstripped motor blocks can find no takers, and this will probably be the first item to go under ceiling.

New York — Despite reports that some cast grades of scrap can be bought below ceilings, brokers insist that cast has more strength here than in other districts and the price line is sticking close to OPS levels. Some higher grade cast has been sold as cheaper grades by dealers. Cast movement is slow but one major foundry is expected to enter the market this week—at ceiling, one broker believes.

Detroit—An easier scrap situation exists here today even though the long term outlook is still unpromising. Cast grades are very soft. Reports of sales under the ceiling price, while unconfirmed, are commonly heard. Electric furnace mills are reported to be comfortable for the first time in many months. Buying of stainless scrap by one mill has been temporarily discontinued.

Cleveland—Scrap shipments are a little freer this week, although mills are still hard-pressed to replenish depleted inventories. Industrial scrap output has fallen heavily with some yards forced to reduce labor forces. Electric furnace grades are being subjected to much closer scrutiny by mills. Tighter inspection is throwing some electric furnace grades to foundries.

St. Louis—Demand for cast iron drops as foundry orders decline. The only sales are being made to brokers to fill outstanding contracts, but these are few, and are at prices below the ceiling. This below-ceiling selling is said to be done largely by railroads, who, in some instances, are offering the material f.o.b. St. Louis instead of on-line, thus absorbing the freight. Movement of melting grades to the steel mills is picking up.

Birmingham—The scrap situation is about unchanged this week. A fair amount of heavy melting continues to come into the district and mills in the area are reported in good shape and much of this type of scrap is going to mills in the North. The cast market is dull with some yards having a heavy supply. Although prices on two categories have dropped below the ceiling, sales are slow.

Cincinnati — Scrap inventories at Newport Steel are in fairly good shape due to an accumulation resulting from a strike and a shutdown of openhearths occasioned by threatening flood waters. Scrap shipped in during the strike has all been unloaded. Another mill here reports scrap inventories improved and shipments flowing evenly into the mill. Reductions in cast prices, particularly motor blocks, are indicated by the setting of ceiling price *delivered* to the mill regardless of point of origin.

Boston — The bottom has literally fallen out of the cast market and at least three items are selling below the OPS ceiling price. Cupola cast is quoted about $2 to $3 below the ceiling at a $46-47 price. Stove plate in even less demand brings about $42-43, and motor blocks about $40.

Buffalo—With cast scrap reported selling below ceilings in the Troy-Utica area, the market here continues to hold. But it is soft. Mills are just holding their own on steelmaking grades. New allocations are awaited.

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Ferroalloy Prices

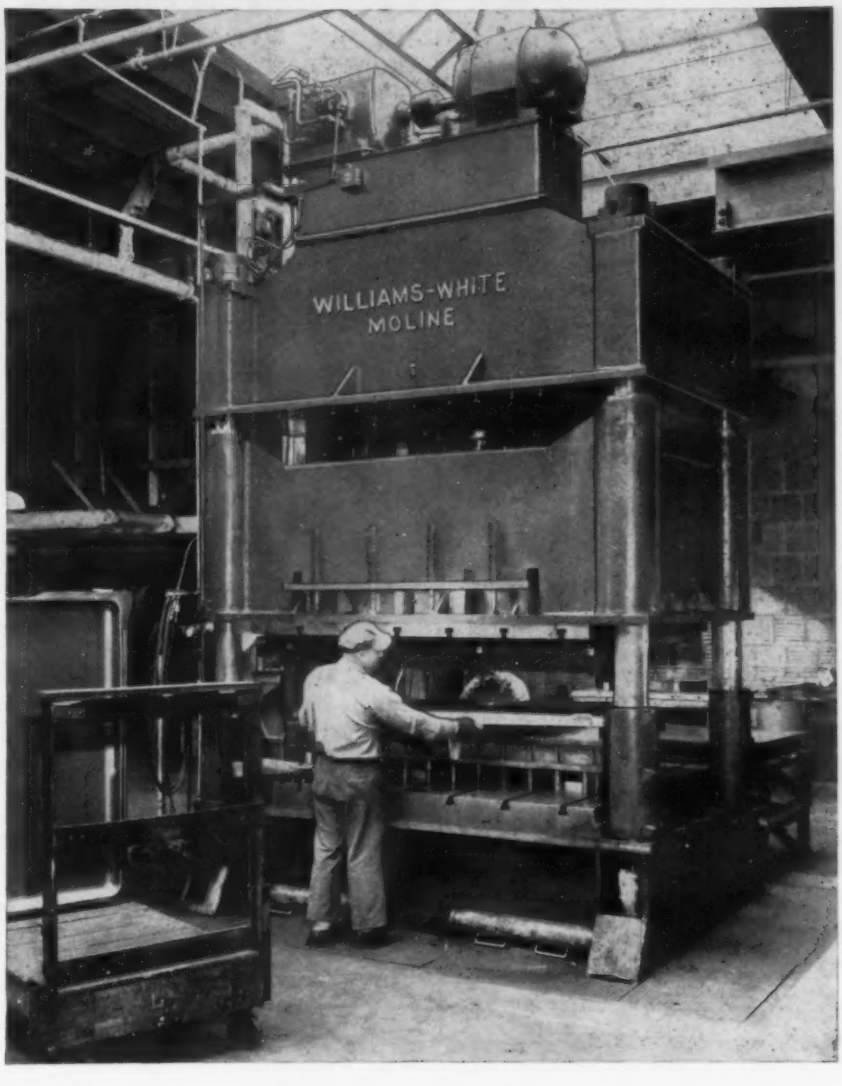
Other Ferroalloys

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.32
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	1.55
Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$5.00
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium pentoxide, 86-89% V_2O_5, contract basis, per pound contained V_2O_5	$1.28
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del. Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B	$5.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots. F.o.b. Wash., Pa.; 100 lb up	$1.30
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	68¢
No. 79	50¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

Drawing Freezer Tops . . . on versatile 400-Ton WILLIAMS-WHITE Press



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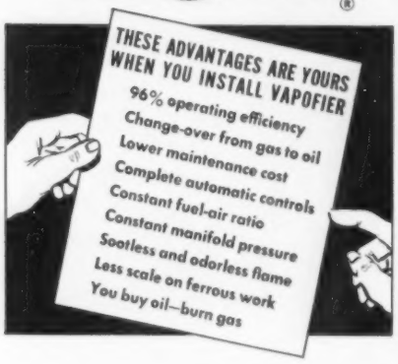
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Constant manifold pressure
Sootless and odorless flame
Less scale on ferrous work
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—International—

New Cornigliani Plant Readied

Italy's steel production this spring will be increased by the Genoa-Cornigliani plant, at the western end of Genoa harbor. The new works, with the latest American equipment, will be one of the most modern in Europe. Total cost was close to $100 million, with some $27 million coming from Economic Cooperation Administration loans.

Work was started on a new steel mill at Cornigliani in 1938 and was almost finished when Italy surrendered in 1943. One of the first acts of the Germans when they occupied northern Italy was to dismantle and ship to Germany everything that could be moved. The little that was left was bombed out.

New Mill—Postwar planning by the Finsider group called for a semi-continuous plant three times the size of the old mill. Work started in 1950 with ECA approval. A coking plant and two blast furnaces have already been built and the foundations of a strip mill laid.

The first blast furnace will be blown in in April. The second blast furnace, together with the openhearth, will start up in August, and the whole plant should be in operation by the end of 1953.

British Set 1952 Import Quotas

Shipments under the British Token Import Plan will be permitted during 1952 at 75 pct of the 1951 rate, it has been decided by the Office of International Trade.

This means that Britain will permit prewar United States exporters to ship to British firms specified commodities up to 30 pct of their 1936-38 average. The amount permitted last year was 40 pct of the prewar base.

No new items have been added to the list which contains 197 items. These include specific iron, steel and aluminum manufactures; items of agricultural and garden machinery; and electrical apparatus.

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

New Member—Another chapter has been added to the roster of Machinery Dealers National Assn. The latest member is St. Louis which joined New York, Philadelphia, Detroit, Chicago, Cleveland and Los Angeles.

NDNA blessing to the St. Louis chapter was given following a Board of Directors' meeting. Firms applying for membership are: Hunt Machinery Co. and Mid-West Machinery Mart, both of Indianapolis, and Industrial Steel Products, Inc., Wm. C. Johnson & Sons Machinery Co., Crown Machinery Co., Mcleod Machinery Co., and Segal Tool & Machinery Co., all of St. Louis. Final approval of applications will be discussed in March at Pittsburgh.

Elect Chairman—The St. Louis chapter will meet shortly to elect a chairman, who will automatically become chapter secretary and an MDNA director.

The directors discussed National Production Authority's proposed inventory control regulation and hoped that clerical work could be kept to a minimum for all parties. They recommended establishment of a priority for machine tools so that every available surplus machine tool could be thrown into production.

Meet with OPS—A used machine tool industry subcommittee met last Friday with OPS officials to talk over the long-proposed adjustment to CPR 80 and issuance of a price book. Dealers are fretting at the stalling tactics of OPS.

NISA Convention—National Industrial Service Assn. will hold its 19th annual convention at the Conrad Hilton Hotel, Chicago, on Apr. 20 through Apr. 24. NISA officials suggest speedy registration. New directors elected recently, who will serve for 3 years, are: Region 1, Alfred Elson, Jr., New England. Mach. & Elec. Co., Pawtucket, R. I.; Region 4, John W. Overton, Electric Motor & Repair Co., Richmond, Va.; Region 7, Edward G. Potter, Lima Armature Works, Lima, Ohio; Region 10, Frank W. Ross, Ross Electric Motor Shop, Fairmount, Minn.; and Region 13, G. E. Jones, of G. E. Jones Electric Co., Amarillo, Tex.

MDNA Newsletter—Volume 1, No. 1 of the new MDNA "newspaper" hit the mails recently, reports Randy Vinsom, executive director of MDNA. It's called *What's Happening* and gives news of MDNA activity and news notes on members of the industry. The newsletter will be mailed once every 2 to 4 weeks.

Plant Auction—Industrial Plants Corp., of New York, will put on the block on Tuesday, Feb. 26, the entire plant of a former machine tool manufacturer at 113 E. Washington Ave., Bridgeport, Conn. The firm formerly made the Coulter and Automatic machine tool line. To be auctioned will be lathes, millers, boring mills, grinders, planers, etc.

Inventory Control—NPA's proposed inventory order will certainly be put into effect, the trade feels. It is intended to collect complete statistics on the supply of certain used and imported metalworking machines in the warehouses or shops of dealers and rebuilders.

Reason for the order's formulation is that NPA is eager to keep track of all available machine tools in view of the shortage. Under the order, complete inventory reports must be made by all dealers, brokers, and rebuilders of used and imported metalworking machines (about 38 types).

Aiding Defense—It will empower NPA to direct the trade to hold for 7 days any tool covered by the order so that a specific purchaser may inspect it and buy it if suitable. This will channel used tools into urgent defense uses, NPA believes.

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